COAL AGE

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A Happy and Prosperous New Year

By R. Dawson Hall

AUSPICIOUSLY indeed does the New Year open with everyone working. For the immediate present at least (how long it will continue no one knows) we are enjoying a period that is free from strikes that are the normal ills of prosperous times. If we can only work steadily without domestic strife, the year 1920 will fulfill the most cheerful of our anticipations. This is said with full knowledge that the worst strike period this country has ever witnessed is barely over and that a similar or worse period portends.

Perhaps none too often do we wish one another Happy and Prosperous New Years but certainly too little do we strive to make those good wishes come true. The war ended, everybody had visions of peculiarly prosperous times. They would not have been dangerous dreams or unfilled prophecies had we all set ourselves strenuously to seek their accomplishment by steady unremitting toil.

But first of all we waited till everybody was convinced that the high wages and high prices had come to stay, and then we waited again till certain others had become certain that the high war wages were not to be followed by even higher peace wages.

Both parties the wage reductionists and the wage incretionists—pardon the word— are now alike satisfied, let us hope, that the war wages had come to stay but not to grow and that upward adjustments, if any, must be few. The lesson is learned, let us return to our work, happy that the strife did not succeed in killing off the prosperity that is ours.

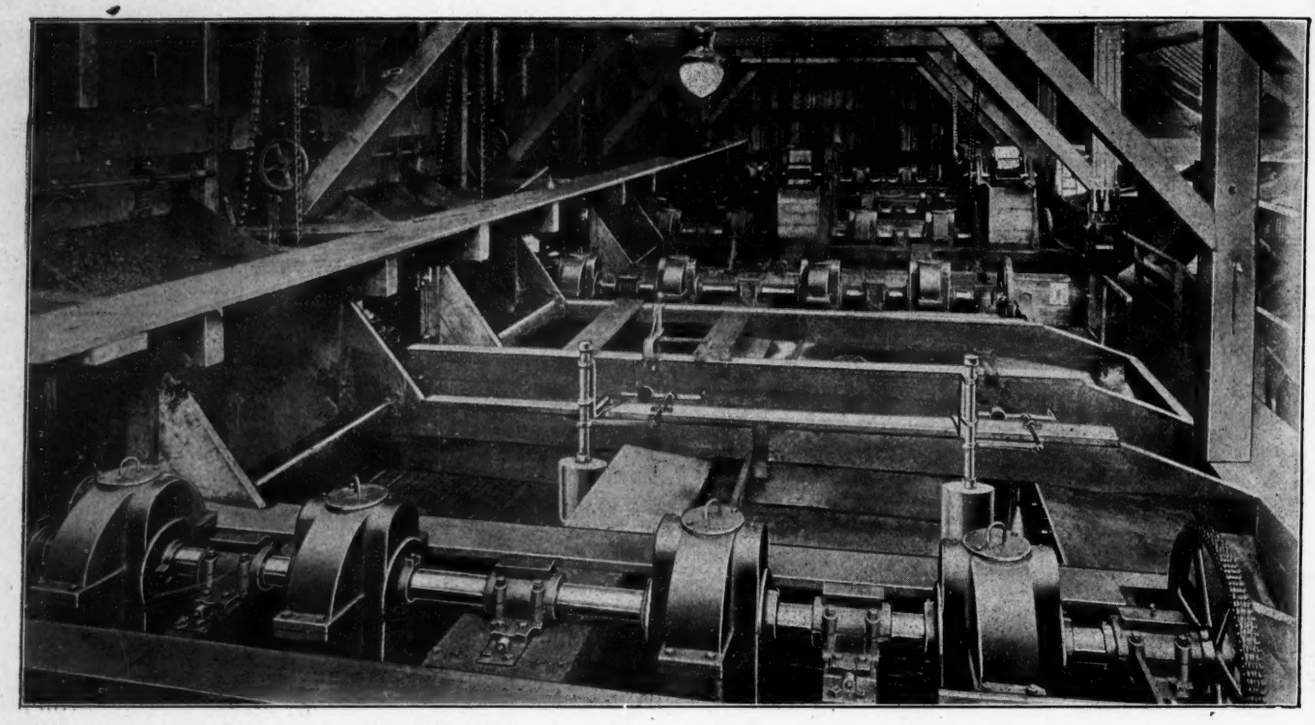
Unfortunately luxury is getting to be almost our biggest industry. We occupy the place that France used to hold, but while France traded in luxuries with the whole world, we largely serve with such frivolous things only ourselves. If our prosperity is to travel along on an even keel we must place it boldly on the progress of the staple, basal and essential industries, not on the parasitic trades which do not feed the bird but merely feather the nest.

It must be our great task to put the railroad industry and the street-car service on their feet, for without these even the luxury trades must suffer. In fact the success of the luxury trades will be their own undoing. Only in real material development can a people grow and prosper in such a degree as to make luxuries possible.

When the work and genius of a whole people goes into making "joy wagons", moving pictures, cigars and elegant wearing apparel, then that people soon falls into decay. The ploughman, the miner, the common laborer, the railroad man, the seaman and the worker in metals typify the forms of industry which make for national prosperity.

The workers in these trades, whether capitalists or laboring men must not by combination hold up their fellow countrymen, but neither must they be subjected to restraints from which other capitalists and other laboring men are relieved. They must not by general strikes and general lockouts hold up the public, nor must the public by special repressive legislation hold up them.

In 1920 may we have maximum production and may real productive industry come once more into its own. Conditions will never become sound until the public serves best those who by catering to its real needs serve the public most.



INSTALLATION OF FIVE ELMORE JIGGING MACHINES IN PLANT OF CARBON HILL COAL CO., CARBONADO, WASH. EACH JIG HAS TWO COMPARTMENTS FOR HANDLING FINE COKING COAL

Modern Practice in Coal Washing*

By Horatio C. Ray†
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Coal washing is undertaken in order to reduce the amount of impurities contained in the coal. Larger sizes of coal can best be treated in jigs while the smaller sizes can be handled more efficiently on concentrating tables. Sludge sedimentation and water clarification may also be effected by means of suitable apparatus.

IT is not the intent of this paper to give a treatise upon the subject of coal washing, since this has been well covered in a recent series of articles by Ernest Prochaska in Coal Age. Rather this paper shall deal with some of the recent changes in the art and some of the problems introduced or intensified by these changes.

Since coal washing is for the purpose of removing deleterious substances, let us consider first, what are the impurities with which we have to deal. Impurities in coal may be grouped into two general classes:—Chemical and mechanical. Chemical impurities are those that are so intimately mixed with the coal that they form a part of its composition; they include the ash coming from the organic matter from which the coal was formed, all or nearly all the phosphorus, and that part of the sulphur coming from the same source as the ash. It is obviously impossible to separate this class of impurities by mechanical means.

Mechanical impurities are those that form a more or less intimate mechanical mixture with the coal, but do not enter into its composition. These are slate, bone, pyrite, and occasionally calcite and gypsum. Intimacy of the admixture is the most important factor in considering the possibility of commercial washing.

Slate is usually interbedded with the coal, and ordinarily is freed from it by a minimum of crushing, hence it offers, as a rule, little interference to separation.

Bone, or "bony coal", consists of a mixture of coal and slate so interstratified that the two cannot be separated. This material varies widely in its carbon content, so that at times small amounts may be left in the coal without a serious increase to the ash content. Since its specific gravity usually differs but little from that of coal, its separation ordinarily offers great difficulties.

Pyrite, which is the chief source of the sulphur in coal, and often, the source of much ash as well, may occur in several forms:—(1) In rounded, or lenticular masses, in which condition it is easily separated from the coal by crushing and washing, its specific gravity being relatively high (about 5). (2) Thinly interleaved with the coal. In this occurance, separation is difficult and requires finer crushing and more careful preparation before the final washing. When gypsum, or calcite, are present, they usually occur in this same manner. (3) As little discs, like fish scales. These scales are usually so buoyant that they accompany the coal in washing, and may complicate considerably the problem of water recovery.

There is still another source of impurity, which is not often given the attention that it deserves. It is from pieces of either the underlying or overlying strata, or both. This can be controlled to some extent by mining but in many cases forms a considerable part of the impurities, especially in those cases where the bottom is rough, or where there is an overlying layer of brittle material. Fortunately this material is often of a character to make its removal by washing comparatively simple.

Until recently, it might be said that there were two chief reasons for washing coal: (1) In years past much coal

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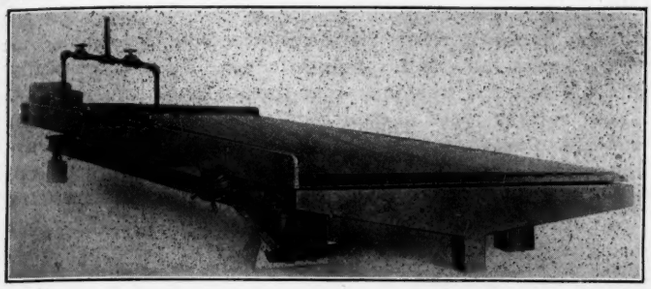
was sent to the waste dumps as being too fine for the market. Ways were found in which this coal could be utilized, and as it was mixed with a large percentage of impurities, washing was resorted to. (2) Coal used for coking must be washed in order that the sulphur may be lowered in percentage below that which would cause trouble in metallurgical operations. Some coking coals are



VIEW OF DEISTER OVERSTROM COAL WASHING TABLE

naturally sufficiently free from sulphur to meet this requirement but many are not.

The first of these reasons applies specifically to the anthracite coal industry, where washing for years has been the rule rather than the exception. The demand for small sizes of anthracite, fostered largely by the coal producers, has become so great that the unsightly "culm banks" of former years are almost gone, and the current production of this material is washed instead of being piled as before. The bituminous industry does not have this material, for its waste piles in many cases have been and are burning. Furthermore the rejected coal is mixed with so much rock and slate, as to make commercial washing improbable, if not impossible, for many years to come.

The second reason has become more vital every year. Altough American coals, such as those of the Connellsville region, that can be made into good metallurgical coke without washing, are not near exhaustion, they have reached or about reached, the peak of their production. On the other hand, the demand for coke low enough in sulphur and ash to be used in metallurgical operations has grown enormously, so that it can no longer be supplied by those fields. This has led to the use of inferior coals, which demanded washing before coking. The demand is likely to become still more urgent as the production of these fields decline, and it may become a problem before this decline becomes great, because metallurgy is seeking betterment in this matter of fuel, rather than the maintenance of present standards. I would predict therefore that the rapidly increasing use of by-product coke ovens will render this subject of washing increasingly vital in the near future.

In recent years, several other factors have tended to bring this subject to the attention of the coal producers. One of these is the education of the industrial, and even the domestic user, of coal and coke. Where formerly any kind of coal was accepted, which passed the casual inspection of the eye, and in many cases not even that, it must now pass the test of the chemical analysis, as well as the boiler trial. Even some of the better coals have difficulty in passing these tests, and their producers are compelled to accept lower prices on account of inability of their product to meet certain specifications, or such a product has at least been restricted to or from some particular market. This has necessitated in many cases installations of washing plants.

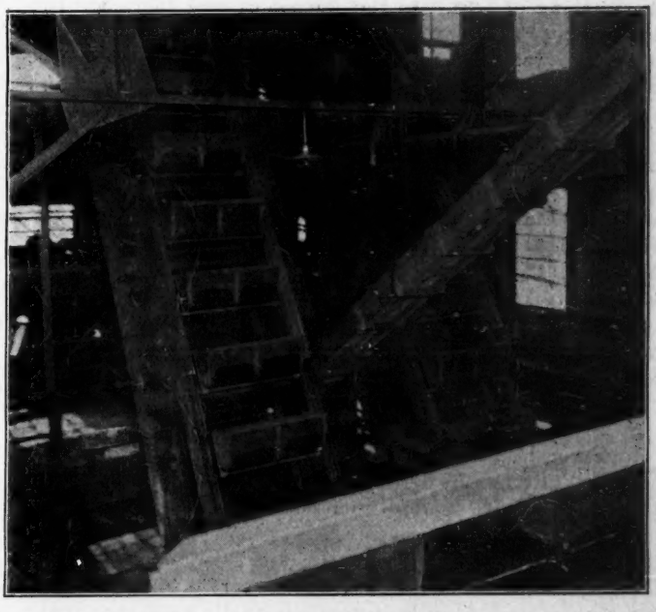
Another of these factors is the possibility of producing a superior product for which the market will pay an increase in price, not only sufficient to defray the extra expense of washing, but enough to yield a profit on the washing itself. Under those market conditions where the supply appears to exceed the demand, as it frequently does in the bituminous coal industry, the possibilities of a superior coal ought to be worth consideration.

Another factor, which at present is of some importance, especially in the western fields, but which promises to become more and more important, even in the eastern regions, as time goes on, and the production from beds already opened declines, is the marketing of inferior high-ash and high-sulphur content coals. As already pointed out, since the consumer is not likely to accept a reduction in standards, improved washing must result.

Still another factor, which was brought about by the exigencies of the war, is the production of pyrite suitable for burning in the manufacture of sulphuric acid. Under the proper combination of circumstances this might be equally successful in peace times, even in competition with cheap sulphur and pyrite. If I am not incorrectly informed, there are still operating successfully several plants producing this material. The pyrite produced from coal is usually of a chemical character especially desirable (because of the absence of certain deleterious impurities, such as arsenic) in the production of acid.

Summing up, some of the principal advantages following the washing of coal are:—

1. The removal of objectionable sulphur, which is important from even a physical standpoint, since fires from spontaneous combustion in coal bins and piles are conceded to be largely due to the heat generated in coal containing a considerable amount of sulphur; 2. The increase in heating value of coal; 3. An increase in boiler efficiency; 4. A reduction in the amount of combustible matter lost in the ash; 5. A decrease in transportation difficulties; 6. Washing renders marketable the product from low grade coal,



DEWATERING ELEVATORS AT MIDDLEFORK WASHERY, BENTON, ILL.

or screenings, heretofore wasted; 7. It renders possible an increase in the use of pulverized coal, thereby increasing markets; 8. Washing makes probable increased prices and profits.

Until within the last few years, coal washing has been carried on by means of trough washers, ascending current washers (such as the Robinson), jigs, and in a few cases the Campbell table. Trough washers and ascending-current washers will not be considered here. The ascending-current washers, however, should be given credit for first

awakening interest on a large scale in the subject of coal washing. The Campbell table, which is the forerunner of modern methods, is given no further mention here, because of certain inherent mechanical defects and low capacity.

It is well at this point to consider the principle underlying coal washing. The action of every coal washing apparatus, or machine, depends upon the difference in the velocities with which identically shaped particles of various specific gravities settle in water. That is, if pieces of coal, slate and pyrites of approximately the same shape are dropped into water, the pyrites, having the greatest specific gravity, fall most rapidly; then the slate Sp. G.; and finally the coal follows.

It will be readily seen that size and shape are bound to exert an influence upon this settling power. There can easily be conceived those conditions (which actually occur in practice) where pieces of pyrite, slate and coal of equal settling powers, although of different specific gravity, size and shape, will be found together. The obvious solution of this is to so limit the difference in sizes, that settling power comes to depend mostly upon specific gravity. The effect of difference in size must be kept in mind in the consideration of this problem of coal washing.

IMPURITIES MUST BE SEPARATED

In order to separate the coal and the impurities it is necessary that they be detached from one another. This is done by crushing, and the proper selection of a crusher is important. In general, toothed or corrugated rolls for coarse crushing, and hammer crushers for fine crushing are used. It will be readily appreciated that finer crushing will be necessary to free the coal in some conditions, than is necessary in others.

Jigs have been and still are the machines most used in the washing of coal. In the jigging of coal there are two practices: (1) The raw coal is washed; and (2) the coal is sized then washed. In the former practice, the coal is sent directly from the bins, usually after crushing, to the jig, and the feed will vary in size from that of the largest treated to the finest of dust. It is obvious, keeping in mind the principle underlying coal washing, that an efficient treatment of these different sizes is impossible. What actually occurs is that the finer material is washed away with the coal regardless of its character. If this is high in impurities it must be separated from the coal later by screening. In the latter practice, the coal is divided into two or more sizes by means of screens, the larger sizes being treated on coarse-coal jigs and the smaller sizes on fine-coal jigs.

Fine-coal jigs have been in use for a long time for treating the small sizes, but they are not particularly well suited to this work, both on account of the character of work done and certain inherent defects. One of these is that an artificial bed must be maintained upon the screen, made up of material larger than that treated, since the screen openings must be of sufficient size to allow the free passage of the water currents. Of recent years there has been a growing realization among operators, especially those producing coal for the making of metallurgical coke, of the necessity for a machine that would be more economical and efficient in the washing of the smaller, or finer sizes of coal, say, that which passes through a ½ in. perforation down to the finest dust. To ascertain the best method of doing this much experimentation has been carried on with various types of concentrating tables.

The table concentration of ores has been carried on successfully for a number of years. When tables were first introduced (about 14 years ago) they revolutionized the concentration of ores, replacing many of the fine jigs then in use. They seem destined to do the same in coal washing. The difference between the washing of coal by the table method and the table concentration, of ores, is, that in the former, the pure coal, being of lower specific gravity than the refuse, is removed along what is ordinarily known in the treatment of ores as the "tailing discharge edge", while the refuse is taken off over the end of the table where the valuable constituents of the ore are ordinarily removed. In other words, coal washing is the exact reverse of ore concentration.

Many types of tables have been used in the concentration of ores, but so far only two have been successfully adapted to coal washing, the Deister and the Wilfley. These various types of tables differ but slightly, in main, and not at all in principle. The chief difference is the arrangement of the riffles and the mechanism for giving the table its motion. The tables as adapted to coal washing are but little different from the ore type, the usual change being a slight enlargement, both as to length and width, and a consequent strengthening of the construction. The two types mentioned differ only slightly so that a description of one will be sufficient.

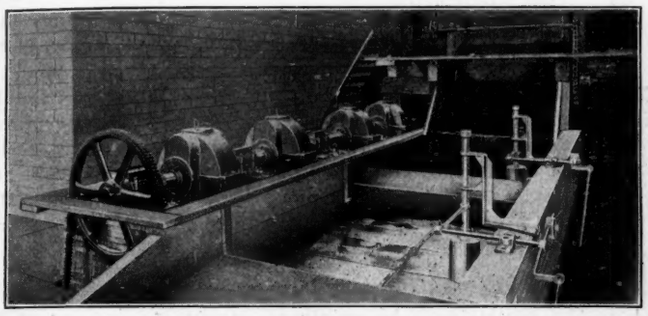
DETAILS OF THE DEISTER TABLE

The Deister table as used in coal washing consists essentially of a linoleum-covered plane surface, or deck, approximately the shape of a parallelogram, about 8 ft. wide by 17 ft. long (the Wilfley being about a foot narrower and shorter), transversely inclined, and reciprocated endwise by a head-motion mechanism. The deck is supported by means of toggles, or slides, on a tilting frame, which allows the transverse inclination to be readily changed. The tilting frame is held firmly by a base built up of channels and steel plates. On the top are tacked wooden cleats, or riffles, which taper vertically from the head-motion end, where they have a thickness of about ½ in., to a feather edge at the "refuse discharge end". The riffles terminate in a diagonal line. They are about ¼ in. wide set about 1¼ in. apart, although this varies somewhat according to the size of the material treated. The elements which influence the particles upon the table are: the length of the stroke imparted by the head-motion; the side inclination of the deck; the quantity of feed and wash water; and occasionally the longitudinal slope. In many cases however no longitudinal inclination is given.

In the table washing of coal, the operation is as follows: —The raw coal, previously mixed with about twice its weight of water, is delivered to the feed box in the upper corner at the head-motion end of the deck, and thence through a series of small holes onto the deck. Water distributing boards are provided and attached to the same side of the deck as the feed box in order to obtain a nice adjustment in the distribution of water over the deck surface. The table is erected in a horizontal position and is practically level longitudinally, that is, along the line of its reciprocation. A slight side inclination at right angles to the line of reciprocation, and which is adjustable in order to meet changing conditions, permits the clean coal to be washed down over the long edge of the table into a trough, or launder, through which it flows to its ultimate destination, while the action of the head-motion in reciprocating the deck at approximately 275 strokes per minute, with a length of stroke of ¾ in., drives the sulphur and refuse, which stratify next to the surface of the table deck in accordance with their greater specific gravity, out and over the short edge, or refuse end, of the table, where it is caught in launders and conveyed to the refuse dump. The wooden riffles on the surface of the deck aid in collecting and guiding the refuse to its proper point of discharge from the table, and also prevent the finer particles from washing over with the clean coal.

The capacity of a coal washing table is variable, depending on the ease of separation of the refuse from the clean coal, and also on the purpose for which the clean coal is to be used. For example, if the coal is intended for use under boilers, or in pulverized-coal plants, the requirements, with reference to the reduction of ash will not ordinarily be stringent, necessitating less careful washing with a correspondingly greater capacity per table; on the other hand, in the washing of coal for the making of metallurgical coke, the prime requisite is the reduction of sulphur to the lowest possible limit, making necessary great care in operation of the tables with a corresponding reduction in capacity. The capacity of the Deister table ranges from 7 to 10 tons per hour on bituminous coal.

The maximum power requirements per table are about



INSTALLATION OF AN ELMORE COAL JIG

1½ h.p. The amount of water needed is approximately 470 gal. per ton of raw coal treated.

Coal washing tables are usually fed from storage bins by means of some positive arrangement, such as a screw conveyor, which will insure a steady continuous flow of material, which is absolutely essential to good working as is the case with all washing machinery. With such an arrangement, the table can be adjusted to a certain position and requires little attention, except to see that there are no chokeups of launders, water pipes, etc. In fact, one good tableman, who thoroughly understands the work should be able to operate 50 of these tables as readily as one.

As will be readily understood there is bound to be in the product coming to the table certain particles, which will be composed of coal and slate, coal and bone, or coal pyrites. The reason for this is that the crushing has not detached the different materials one from another. The fineness of crushing is, of course, a matter to be decided entirely from the viewpoint of the profit balance sheet. The amount and character of the final material will depend upon the degree of admixture of coal and impurities in the raw feed. This material, which is neither coal nor refuse, obviously, however, will have to be finally placed with one or the other, or be divided between them, depending upon its character, amount, and the result desired from the washing. So it will be seen that there can be no sharp line of division between the products. This has given rise to the practice of removing this mixed material as a separate product, called middle product, or middlings. In ore dressing, this material is either stored awaiting more improved methods of treatment, or in most modern cases, is recrushed and reconcentrated. In coal washing, the same practice, has been followed, even when using jigs. In this case the middlings from the coarse jigs are recrushed and treated on the fine jigs, the middlings from the fine jigs usually being rewashed without crushing and eventually getting into one or the other of the products. By the use of tables it has become possible to recrush and treat this material from fine jigs or from other tables working on coarser sizes. This, of course, results in a saving of coal and a reduction in the ash. Both of which are important factors.

On account of varying conditions, it is extremely difficult to get an idea of the cost of plant installations, but estimates have been made which run all the way from $3600 for single table installations for the treatment of screenings and refuse from the balance of the washery, to $300,000 for a 60-table plant of concrete and steel construction. The per ton cost of operation, which includes interest on the investment and plant depreciation, has been estimated at from 10 to 12 cents per ton on a single table installation to as low as 3 to 5 cents per ton in a plant of 1000 tons daily capacity.

From a large number of tests made on Illinois coal containing sulphur extremely difficult of reduction, the following have been selected as representative:

TEST No. 3

	Total Lb. Dry Wt.	Per Cent. Total Wt.	Per Cent. Ash	Per Cent. Sulphur
Raw coal	1593.00	100.00	12.50	3.12
Washed coal	1394.50	87.54	6.09	2.36
Pyritic-iron refuse (sulphur)	8.50	.53	67.17	31.06
Refuse	190.00	11.93	48.63	6.87

TEST No. 10

	Total Lb. Dry Wt.	Per Cent. Total Wt.	Per Cent. Ash	Per Cent. Sulphur
Raw coal	1017.00	100.00	17.62	3.54
Washed coal	796.00	78.28	6.65	2.44
Refuse	174.50	17.15	53.15	9.09

From the foregoing figures, it will be noted that the ash content of the washed coal is approximately the same in each case; in other words, it represents closely the small amount of fixed, or non-removable refuse. A critical analysis of the work in these tests indicated that washing by the table method eliminated 90 per cent or more of the free or removable ash and sulphur content. In each of these tests, the coal was washed at the rate of approximately 8½ tons per hour.

From tests run on Pennsylvania bituminous coals, the following have been selected:

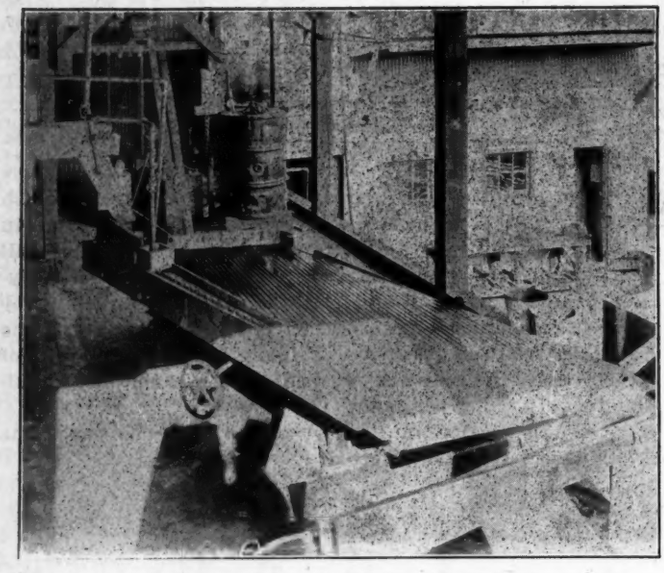
RAW COAL		WASHED COAL ASH			REFUSE SULPHUR		
Per Cent Ash	Per Cent Sulphur	Per Cent Ash	Per Cent Reduction	Per Cent Sulphur	Per Cent Reduction	Per Cent Ash	Per Cent Sulphur
12.13	2.54	6.34	46.20	1.17	53.94	51.26	11.73
16.01	2.59	6.09	63.99	.90	65.25	55.86	8.48
10.52	1.85	5.46	48.17	.84	54.60	48.53	10.34
18.20	2.49	7.90	56.59	1.00	59.82	66.80	9.11
11.00	3.22	5.87	55.73	1.32	59.01	52.22	18.91

Dewatering of the washed coal has always been one of the important problems in the consideration of coal washing. Obviously, the consumer does not wish to pay for water in the coal, yet unless it is removed someone must

JIG IN PLANT OF DURHAM COAL CO., WASH.

pay the freight on it and this charge must be added to the cost of the delivered fuel. Water, of course, is not combustible and, therefore, some heat will be consumed in heating it in whatever operation the coal is used, with a consequent lowering in efficiency. Further, in the temperature zone, where there are winters like we have in the various coal-producing sections of the United States, the problems, arising through the freezing of the wet coal in bins and later in railroad cars, when transported, must be given due consideration. In a general way, it might be said that the lower the water content, the less trouble there will be from this source.

Another reason for close dewatering, is the cost of the water used in washing. A washer, using any process in treating fine coal, be it tables or fine-coal jigs, is bound to use large quantities of water. In many cases an abundance of water is available with an expense arising only from damming and piping, but in those cases where water has



GENERAL VIEW OF DEISTER-OVERSTROM WASHING TABLE

to be purchased or pumped, it becomes a real problem and dewatering must be practiced in order to recover this water, since recovery of at least a large part of it will be much cheaper than the purchase of the same amount of make up.

This problem has become increasingly important with the adoption of concentrating tables,not because they use more water, than jigs, as they usually use less, but because the smaller the particles the more water will be held, since the percentage of voids will be greater, and the more difficult the separation becomes because of the decreased porosity of the mass. Moreover, the actual minimum percentage to which the coal can be dewatered, without the use of heat, becomes higher as the size of the particle becomes smaller. In any moist mass of insoluble particles from which has been drained all possible moisture, the retained moisture will be made up of water films held on the surface of the particles by adhesion, and the water absorbed by the particles. In the case of coal the latter will usually be of no importance, but the former is proportional to the area of the surfaces of the particles. This increases rapidly as the particles decrease in size.

The percentage of moisture allowable in washed coal (aside from the factors mentioned) depends upon the use to which the fuel is to be put. The two main uses are: (1) Coking coal and (2) fuel coal. The moisture of washed coal charged into beehive ovens varies widely. Replies from a number of operators in the various coal fields place the limits from "so wet that the water would run out the door" to 8 per cent. And the modern tendency is towards drier coal, as giving better coking results.

It is interesting to note that a certain large Colorado coke producer has fixed upon 5 per cent as the lowest moisture desirable, for with moisture below this equally good results are not obtained. Unfortunately he has neglected to state whether this effect is in the coke itself or in the operation of the ovens. In by-product ovens, it seems that 12 per cent is the maximum allowable, with between 8 and 10 per cent as the average, while 6 to 8 per cent are the proportions sought as giving the best results. Dry-screened dust is often added to lower the moisture content. This can only be done in those cases where the dust would be sufficiently low in ash and sulphur to permit this admixture. The degree of dewatering of fine fuel coal depends upon the demands of the consumer, but the moisture should not exceed 10 per cent. A mixture with dry coal can also often be added to advantage in this case.

In the dewatering of coal simplicity of installation should be the keynote, together with economy of space, low power consumption and small installation and operating costs. Also a dewatering plant should so function that a continuous stream of coal is kept moving between the mine and the cars, or ovens, so that, no interruption or even slowing down is permitted.

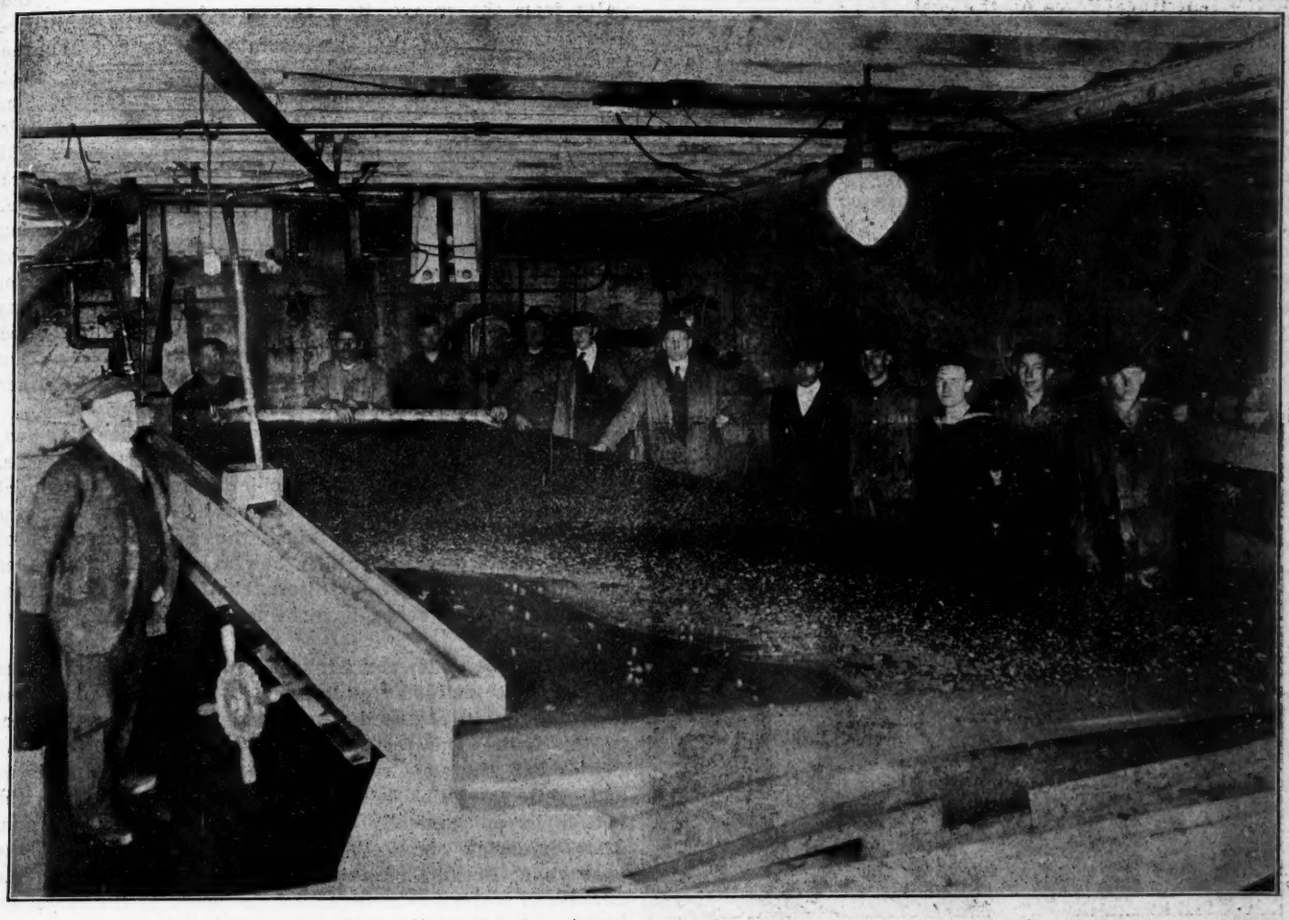
CHARACTER OF MATERIAL INFLUENCES DRYING

The methods to be employed for drying coal must be adapted to the character of the material. This requirement demands especial attention. The coarser coal is ordinarily rather easily treated by draining methods, but the fine material offers serious difficulties and should be treated separately. The character of the fine coal from different mines shows many variations. With a hard, not easily shattered slate, the fine coal, and especially the sludge, are innocuous. The dewatering is comparatively easy and can be, at least partly, combined with water clarification. But if the slate, or what is even worse, the slate and the coal are disposed to produce a microscopically fine pulp held in suspension in the water, the process of dewatering must be carried on in an entirely different manner. This condition is especially noticeable when fireclay is present. In these conditions the separation of the fine material from the pulp must be accomplished in the early stages of the process if it is to be carried out successfully. This is done preferably while the coal is dry by screens or dust-removing devices.

The following devices for dewatering are in use at the present time:—(1) Dewatering bins and pits; (2) dewatering elevators and conveyors; (3) centrifugal dryers; (4) Dorr classifiers and thickeners; and (5) filters (for sludge only). Sludge may be defined as the mixture of solids, formed in the washing of coal passing through a screen with perforations $\frac{1}{16}$ in. in diameter together with water.

At the Franklin washery of the Cambria Steel Co. are employed dewatering pits built of concrete 30 by 30 ft. and 16 ft. deep. These pits have false bottoms made of wooden grates with $\frac{3}{16}$ in. openings between the slats. The coal, as it comes from the washery, is sluiced into these pits where the water is allowed to drain off through the false bottom, or overflow around the edge of the tank. After the pit is full of coal, it is allowed to stand for a number of hours in order to drain off the surplus water. This is a slow process and wasteful of the fine coal.

Dewatering is in many instances simply accomplished in the ordinary washery storage bins, the water and certain of the fine solids passing off through the bottoms, no effort being made to make them tight. Coal going into a bin with 16 per cent moisture having been partially dewatered



VIEW OF No. 7 DEISTER OVERSTROM WASHING TABLE IN OPERATION ON COARSE COAL FEED

by elevators, will drain within 24 hr. down to 12 per cent, but in 72 hr. it can often be reduced to ten per cent and occasionally to as low as 9 per cent.

In Europe, draining bins are commonly employed and the draining off of the water is accelerated by the use of filter bodies made of expanded metal covered with canvas, which open up the densely packed mass of fine coal. Moistures as low as 8 per cent are often obtained in 48 hours by this means.

The disadvantages of draining bins are as follows: On account of the large surfaces the sludge settles out of the water, considerably delaying thereby the process of dewatering. On account of the lack of other drying apparatus, all sludge produced must be sluiced into the draining bins, there to be dewatered. This delays also the rapid draining off of the water. In the emptying of the bins, the coarse coal flows out more rapidly than the fine material and sludge, which later clings to the walls. When the bins are emptied this sludge hangs upon the walls for some time and drops off suddenly in large masses. This destroys that uniformity of the coal which is desirable for the coking process. The bins also require considerable space and head room.

The perforated bucket elevator and the dewatering drag conveyor are quite commonly employed, being used in many instances when other types of apparatus follow. The perforations vary, but when used alone or with bins, they are usually $\frac{1}{16}$ in. in diameter. The excess water, amounting to about 75 per cent of that used in washing the coal and carrying the fine solids in suspension, is sluiced to separate settling tanks. Dewatering elevators and conveyors must be built heavy, depending on the character of the coal, the required capacity, and the distance over which the material must be conveyed. This is the more important since the speed must be slow in order to give the water time to drain off. In elevators the inclination and the distance apart of the buckets must be such that the buckets do not drip their water into the ones lower down. The following table gives some data on elevators and conveyors:

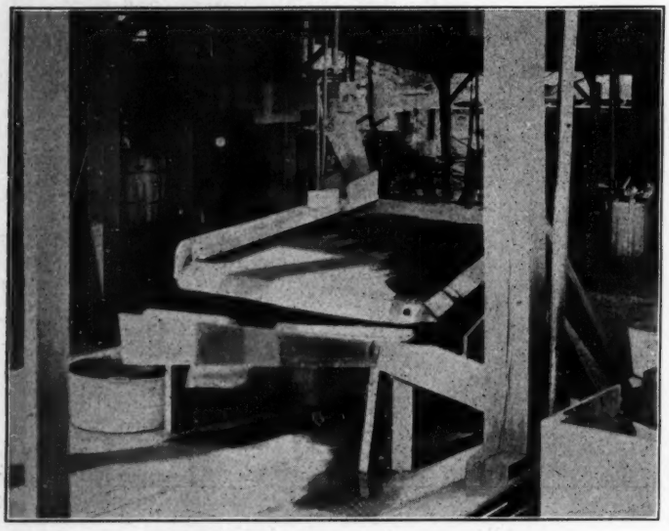
Type	Dimensions Width	Length	Slope Degrees	Speed Ft. per Minute	Per Hour Capacity Tons	Power H.P.	Dewatered Moisture Per Cent.
Conveyor...	32 in.-13 ft.	50-130	0-40	1¾-12	5-60	4-18	10-13
Elevator...	20 in.- 6 ft.	50-130	40-65	3 -32	10-60	12-32	10-13

Centrifugal dryers are the most efficient pieces of apparatus now in use for the purpose of reducing the moisture in the washed coal below 10 per cent. To really do efficient work these machines require the moisture of the incoming coal to be reduced to about 15 per cent, which can be quickly done by the dewatering elevator. Centrifugal dryers on account of their high speeds, are restricted to the dimensions of the revolving parts, hence are limited in capacity, so that only those that are continuous give a satisfactory output. Their greatest disadvantage, which ought not to be serious, lies in the wear of the screen plates. The use of a protecting grate, or inner coarse screen, or the keeping of a thin layer of coal on the screen which would act as a filter and protect the screen from abrasion, ought to solve this difficulty. The screen, in order to have the requisite strength, must be so coarse that it allows the escape of the finer material. There is also a tendency to-

wards the production fines because of the grinding action of the centrifugal force on the coal.

The best of these dryers is the Elmore. The screen which is a truncated cone, is supported and made to revolve by the vertical main shaft driven at the top by gears. Revolving on the main shaft is a hollow, or quill shaft, which moves at a somewhat lower rate of speed, carrying a series of flights, or scrapers. Coal is fed through the stationary feed spout in the top and falls into a conical distributor, which throws it against the screen. The water and the fine material pass through and the coal is retained. It is scraped off by the flights and falls to the bottom and thence passes out.

As was said before, these machines work better when the coal is fed to them with some of the water removed, but they do fair work even when the moisture is high.



INSTALLATION OF LABORATORY, SIZE D AND O TABLE

Working on a material crushed through a ¾ in. hole with 50 per cent of it passing through a ⅛ in. round hole, and with initial 50 per cent moisture, the dried coal carried 9 to 11 per cent. When the coal fed was reduced to 20 to 25 per cent moisture, the dried coal contained 8 per cent moisture. When put into the dryer with 12 to 15 per cent of water, the coal can be dried to 6 per cent. This is on a machine with a capacity of 75 tons per hour, with a speed of 400 to 450 r.p.m., and taking a maximum of 35 h.p.

The results of two tests run on a commercial machine in actual practice at Benton, Illinois give an idea of the sizes and show the improved catchment of the fines, especially those below 10 mesh. These results in the second column are brought about by better understanding of the machine and its work, no change having been made in the screen in the time.

ELMORE DRYER TESTS

	7-26-19	9-30-19
Held on ¼ in.	72.02	70.19
Through ¼ in., held on 10 mesh	14.92	11.27
Through 10 mesh, held on 20 mesh	8.52	8.79
Through 20 mesh, held on 40 mesh	1.90	5.95
Through 40 mesh, held on 60 mesh	1.02	1.87
Through 60 mesh	1.62	1.93

Dorr classifiers and thickeners as well as filters are usually only used in the dewatering of sludge and in water clarification. They will therefore be discussed under that heading.

The necessity for water recovery has already been referred to. The importance of this detail in coal washing will be emphasized when it is known that a washery treating 2000 tons of coal in eight hours circulates in that time 1½ million gallons of water. In the separation of the water from the sludge, it is necessary to clarify it, otherwise the density of the water would be changed and the washing affected. In washing, fresh water must be added in sufficient quantity to make up the loss by evaporation, that carried away by the slate, coal and other materials discarded, and the loss by leakage. Since these losses will aggregate large, it should be confined to as small an amount as possible, by employing proper methods of clarification.

The sludge, which is obtained from all the preceding types of dewatering apparatus, consists in most cases of fairly pure coal mixed with water. When this is the case, all that is necessary is the separation of the two, which is comparatively simple. However, if there are finely divided impurities present, such as come from the disintegration of fireclays, there must be first a separation of the coarser materials, usually coal, followed by the clarification.

Heretofore, both of these problems have been handled, more or less satisfactorily by means of settling basins, settling tanks of cylindrical or oblong shape, and pointed boxes, or spitzkasten. This has always been a weak point of the washery, especially when the first two types of clarifiers were used. Recently however the Dorr classifier and thickener, and various filters, that have worked satisfactorily in other fields, have been installed with satisfactory results.

The Dorr classifier consists of a settling tank in the form of a shallow inclined trough open at the upper end. The tank may be set at any desired slope, usually about 2½ in. to the foot. The feed enters near the center and the liquids and the slow settling solids overflow at the closed end, while the quick settling solids are conveyed along the bottom by mechanically operated reciprocating rakes and, after emerging above the liquid, are discharged at the open end. Broadly speaking, the slope of the bottom, the amount of water in the feed, and the speed of the rakes determine the character of the two products.

DETAILS OF THE DORR THICKENER

The Dorr thickener consists of a slow moving mechanism set in a tank or basin. The mechanism is made up of a central vertical shaft driven by a worm gear and worm, the shaft having radial arms attached at its lower end. These arms carry plow blades set at an angle which, through the rotation of the mechanism, move the settled material to a discharge opening at or near the center of the tank. The feed enters continuously near the center of the tank, and a peripheral overflow trough collects the clear liquid. The underflow, consisting of thickened solids, is discharged through a hole in the bottom. In many cases a pump is connected to this opening and the outflow regulated thereby. The underflow varies greatly in moisture content, depending upon what is desired. With moistures of less than 50 per cent it is not possible to handle the product with pumps. The gentle stirring action of rakes in the pulp gives a thicker product than entirely quiet sedimentation. This stirring has no disturbing effect upon the settling. The rakes move about 1 revolution in two minutes, and require in the smaller sizes about ¼ h.p. for their propulsion.

The Dorr classifier is used to remove the coarser materials in the sludge from the finer solids and the liquids. In those cases where the sludge consists only of comparatively coarse solids in water, water clarification may be carried on in the classifier. In those cases however, where there are extremely fine solids also, the separation of the coarser is carried on in the classifier and the water clarification is secured in the Dorr thickener.

The disposal of the settled material from both the classifier and the thickener depends upon its character. Usually

that from the classifier will be of such composition that it can be sent to the coal bins direct, without materially increasing the ash or sulphur content of the bin contents. Filtering may be advantageous, as the moisture contained in this material will be usually at least 20 to 30 per cent, and if added to the bin coal might increase the moisture of the whole by 1 or even 2 per cent. In case this material is of a nature too high in impurities to be sent to the bins, it can usually be concentrated on tables. If this is not advantageous it must be wasted.

The underflow from the thickener is rarely of a character that can be added to the bins direct, both on account of its impurities and moisture content, which will usually be in the vicinity of 50 per cent. If it contains excessive impurities there is no help for the matter for this material would usually be of a character that could not be commercially treated on tables or other concentrating devices. The high moisture content can be lowered appreciably by filtering.

The only filter which has been successfully used so far is the Oliver. This is because of the fact that it is continuous in operation and hence the costs are within the range of possibility. The ordinary material to be handled by filters in coal washing ought to give rather high capacities. The Oliver continuous filter consists of a drum or cylinder rotating on a horizontal axis with the lower portion submerged in a tank containing the material to be filtered. The surface of the drum is divided into compartments or sections, the dividing partitions being parallel to the main shaft. These sections are covered with screen for supporting the filter medium which is held in place and protected from wear by a wire winding. Each of the sections of the drum is connected by means of pipes passing through a hollow trunnion to an automatic valve, which controls not only the vacuum for forming the cake, but also the admission of air for discharging the cake.

A scraper is fitted across the face of the drum to insure that the cake is entirely removed after being released by air or steam pressure. An agitator suitable for the pulp being filtered is placed in the tank beneath to keep the heavier particles in suspension so as to insure a uniform cake. The filter is entirely automatic and constant attendance is not necessary so labor costs are low. The total expense will be about 3 or 4 cents per ton depending upon the costs of materials, and, of course, upon the substance to be handled. The filtering rate varies from 1000 to 2000 lb. dry weight of coal sludge per square foot of filtering area per day of 24 hr. The discharged cake will contain from 10 to 20 per cent of moisture depending upon the fineness of the product, specific gravity, and temperature of filtering. Coal sludge, however, presents in most cases an easy problem.

SUMMARY

Coal, which contains mechanically mixed impurities, can be successfully washed after crushing sufficiently fine to free these impurities from the coal. Jigs are economically and satisfactorily used for the treatment of coal ½ in. in diameter, or larger. For sizes below ½ in., reciprocating tables are more efficient and economical.

Coarse coal can be satisfactorily dewatered by a combination of bins, elevators, and conveyors, or by mechanical dryers. Fine coal and sludge dewatering, combined with recovery of the water is best accomplished by settling devices, such as the Dorr classifier and thickener, and by filters.

In conclusion, I wish to express my thanks to those manufacturers who so kindly loaned illustrations and furnished information. Also to those operators and others who gave practical information from operating plants. Without the help of these people this article could not have been written.

The Mine Foreman

By C. L. Green
Fairmont, W. Va.

THE real key to the labor problem in a mine is the foreman. The importance of this position is in many cases at least almost equally divided with the shot-fire in mines where such men are employed. For the sake of brevity therefore we will in the discussion which follows include shot-firers, who in reality act as sub-foremen as well as foremen proper.

Operators may plan as they will, they may be willing and anxious to extend to their men every human consideration, they may put forth every effort to make working conditions right, and after all this has been done they may meet with failure in solving their labor problems if the foreman is not what he should be.

General officials, managers and superintendents are one and all helpless if the foreman through ignorance or malice, does not, in his personal contact with his men, carry out the policies of the operator, or company.

The management plans, the local managers and superintendents may earnestly and honestly try to put those plans over to the men, but in order that they may reach and stick, in order that they may be rightly put, and in a way that they will stay put, the plans must be delivered by the foreman, for he it is who is in contact constantly with the men. He and he only of the management is in constant personal touch with the workmen themselves. He virtually holds within his personal power the fate of the worker, in that he it is who decides whether the worker shall continue at his work or not. This is true, even though the power of discharge does not lie with him, for if he decides that a man is not desirable, that man will go, whether discharged or not, since the foreman can and often does, make his life so miserable that the man cannot or will not remain on the job.

EXACTING SELECTION OF FOREMEN ADVISED

This being the case it naturally follows that the greatest care should be exercised in selecting foremen. Too often a foreman is chosen because he knows his work, without due consideration being given to his knowledge or lack of knowledge of human engineering. Of what possible value can a man be to an organization, no matter how well he knows the work which he is engaged to supervise, if men will not work under him? The manager, even the superintendent may be a man of a personality not congenial or one that does not draw men to him, and yet if he has full knowledge of his work he may "get by" successfully, if he has a good foremen, for the foreman acts as a buffer between management and men, and thus forms the contact that completes the circuit and makes the man power of the plant effective.

The human problems of a plant are after all the hardest ones to solve. Techinal problems have long since been left to experts, but the human side, the one most important of all, has been until of late considered of too little importance to receive particular attention.

If machinery breaks down or does not operate smoothly, a highly skilled mechanic is called in to locate and remedy the trouble. In matters of engineering we get the best to be found for the work and their word is law. If the mules are sick or do not work well we call in a specialist, the veterinarian, whose advice is followed to the letter, but if labor problems arise it seems to be the belief that anyone can solve them. We will not trust the manager, the superintendent or foreman to repair a complicated or expensive piece of machinery, nor is he called upon to doctor the

sick mule, but we expect him to remedy labor troubles, while in fact he has probably given more thought and real mental effort to both machinery and mules than he has to the intelligent study of human beings and to human engineering.

The foreman who does not make good is not so much to blame for his short-comings as is the man who selected him for the job of foremen. We cannot expect a good foreman if we have selected a man simply because he knows the technique of his work, or is a good driver of men, or has a reputation for getting big tonnage. He must in order to succeed know, first of all, men, and how to win from them their best efforts. And he must secure these in such a way that they give freely and willingly the best that is in them.

We will fire a man who will overload a motor or abuse a mule, even though he does either to increase the tonnage or the mine; yet we often promote the man who overloads or abuses men with the same object in view.

JUSTICE MUST EVER BE PRESENT

The real foreman is he who through reason of his being in constant personal touch with the worker, and, while securing all that is to be reasonably had from him, must at the same time, advise, protect and conserve the worker's energy. He it is who must through his understanding of men, see that they work safely, and contentedly, that fair play is afforded to each man alike, that each is given the same opportunity to "make good", that each man shall be heard fairly in case he has complaint to make or information to ask; that each man gets a fully square deal in his work.

In order to do this, the foreman must be a man who not only knows his work, but must be a real human being himself, a normal man, not one whose mind is distorted through past abuses or reverses, but a man who recognizes the justice of the claim of every other man to a square deal, and has that fairmindedness which will cause him to act justly.

He must have the full confidence of his men; he must have leadership; he must be systematic; he must be sincere. The confidence of his men will depend upon his ability in his work, his sense of fairness, and the extent to which he treats his men as human beings.

Leadership can exist only when confidence has been established and is augmented by personal example. Men follow only such men as they regard as superior, in some way, to themselves. The true leader always appreciates honest effort and knows when and how to reward it.

System is essential. The man who never knows what to do or when or how it is required to be done cannot be efficient. The good foreman will be systematic and through his brief, clear orders his men will know what he wishes done and when and how he desires it accomplished.

The sincere foreman, the one thoroughly interested in his work, the one who has the best interests of his industry at heart, is the man who will inspire like sentiments in his men. There must be entire absence of bluff, for no man can "get by" on bluff for any extended period, and once his bluff is called or is in any way exposed, he has finished his work and must step aside and make room for a real man.

Team work between foremen is highly essential. Foremen of different mines, and of different parts of the same mine should get together often and discuss their daily problems. No man has any monopoly of good ideas. By the interchange of ideas, all may become possessed of the individual ideas of each, and in this way not only will good plans and practices be absorbed but the bad may be eliminated. Thus the comparison of ideas should be made.

We often hear old operators complain that men are not what they used to be; that men do not have that personal interest in their work that the men of the old days had. The old fellow who thus complains has not stopped to ascertain why this is true.

In the early days of coal mining the operation was small. The operator was often his own manager, superintendent and foreman. He employed only a few men, but most important of all, he knew all of his men. He knew them by their first names, he knew their wives and the names of their children. He knew what was going on in their homes, and if "Billy" was sick or "Mary" had the measles, he knew it and when he met "Tom" the father of these children, he asked how "Billy" or "Mary" was getting along.

This personal touch, this interest on the part of the operator in the personal affairs of the miner formed one of the bonds between employer and employee. And in the work, if "Tom" thought a certain job would be done in a better way, he did not hesitate to discuss the matter with the operator. They were friends and Tom has as much interest in the success of the mine as the owner did.

THE FOREMAN AS THE BUFFER

What has taken place? The coal industry as well as others has developed to such a degree that it is no longer possible for the operator of the executives of a company to continue that personal touch with the men. They can and do have the same friendly intercourse with the managers who in turn have the same relations with the superintendents and so on until it is the foreman who has the personal contact with the men who dig and handle the coal. And the successful foreman is to his men just what the old operator was in former days. To the men he is the company, for he is that part of the company with which they come in contact. Their opinion of the firm employing them is exactly their opinion of him. They are just as loyal to the company as the foreman makes them.

This is why it is said that the foremen is the key to the labor problems of an industry. The men know him, and regard him as being symbolic of the company they work for. This is natural for they rightly argue, this man must be what the company is, his acts must be what the company desires, his treatment of the men is in line with the company's policies, for the company puts him in his position knowing that it is through him that the men will form their opinions of their employer since the impressions they receive are derived from the foremen.

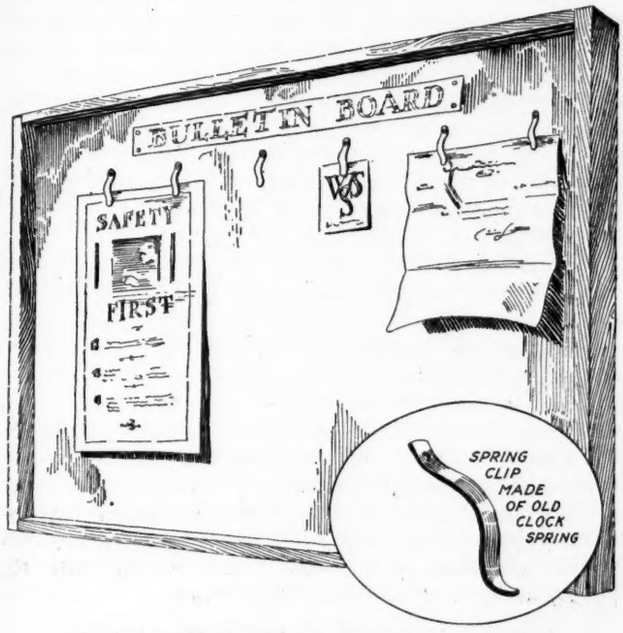
If foremen will keep in mind that their every order and act is interpreted by the men working under them as being what the company desires, if they will keep in mind the fact that in all their work they are to the men no individuals but the company; if in their dealings with the men they will conduct themselves just as they expect the managers and others over them to conduct themselves when dealing with them, many of the misunderstandings and mistakes now prevalent will be eliminated, and they will find that they will command the same respect and confidence of their men as they themselves have for their managers and other officials, with resulting greater efficiency in the part of their men, under their charge, to say nothing of that greatest of all ends to be desired, the true regard and friendship of their charges.

That foreman who drives his men to big output may enjoy the temporary confidence of his manager but he cannot last. That foreman who leads his men to greatest efficiency and output will not long remain a foreman for he will be moved on to better things.

Bulletin Board Clips

By Chas. H. Willey
Concord, N. H.

Thumb tacks for holding notices on a bulletin board are always getting lost. Their use also is detrimental to the board because of the many holes made in it. Pasting the notices up makes an unsightly, messy board, because of the old pieces that are left stuck on. To overcome these difficulties "one of the boys" improvised some very handy spring clips out of an old clock spring, as shown in the accompanying illustration. The holes were punched in the spring by a sharp punch, setting the spring on soft brass when punching. The uses of these clips are clearly shown and need no description.



NOVEL BUT EFFECTIVE CLIPS CAN BE USED

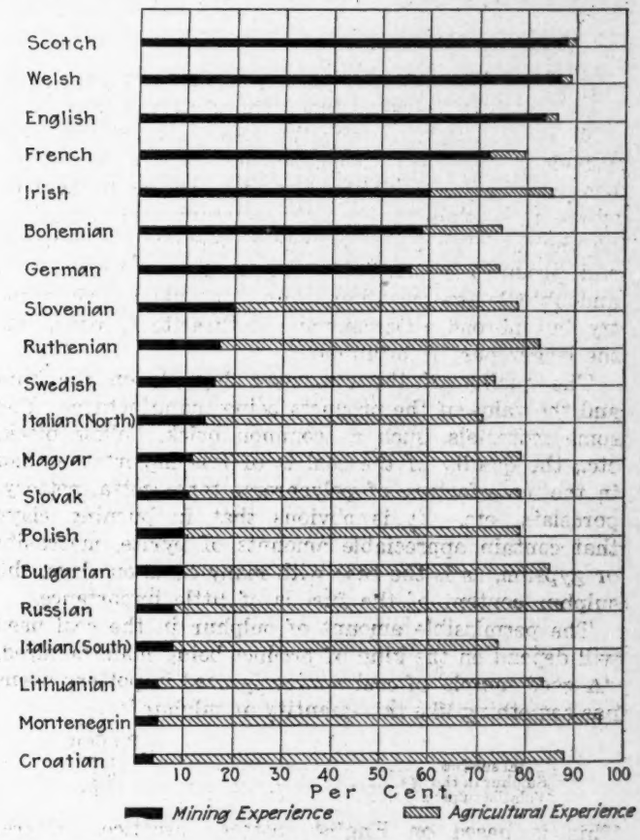
New Laboratories for Spanish Mining Interests

In the extraordinary estimates of the Ministry of Commerce there is an item of 59,490,000 pes. to be destributed over 10 years, out of which much experimental mining equipment is to be acquired, and laboratories established and maintained. Those will include apparatus for deep drilling to facilitate the investigation of all the mineral regions of Spain, and a building for a geological institute. Financial aid will be given to mining concerns, to unwatering syndicates, and to investigation by private enterprise with participation of the State in eventual profits. A chemico-industrial laboratory will be erected for the analysis of combustible mine gases, waters, explosives, and for coal distillation. This will be supplementary to the chemical laboratories of the Mining School and others which in their sphere are recognized as excellent. Testing workshops will be erected for the chemical preparation of minerals provided with apparatus for trituration, classification and concentration, with special equipment for flotation and electromagnetic systems, and also a laboratory for metallurgical tests with reverberatory and electrical furnaces, etc.

Senor Calderon, replying to an observation of the Revista Minera, suggesting that the proposed laboratories appear to be unnecessary as excellent ones are already available, explains that intensive competition is not intended, but that the new institution will provide for the analysis of minerals that have to be submitted afterwards to various tests on behalf of metallurgy, whereas the laboratories now existing are already overcharged with work, particularly that of Gomer Pardo, with the analysis of coal for a number of private firms. Private laboratory owners will be invited to assist in the organization of the new one, which will aim rather at practical scale experiments. The main idea of the new move is to promote the rapid industrialization of Spain, analogous to what other countries are doing.

Our Farmer Mine Workers

Albert H. Fay, statistician of the United States Bureau of Mines, in reading a paper before the National Safety Council published in our combined issue of Nov. 13 and 20 of this year passed from hand to hand a chart that is presented herewith. It shows that the Scotch, Welsh and English mine workers in America were miners before they came here with but few exceptions while all but the French, Irish, Bohemians and Germans were in large percentage farmers before reaching our shores. With such men there is no background of training, and, as there is hardly any possibility of instruction, so little do they learn of English, it is no wonder that the death rate of these men exceeds the death rate of others.



Correction

On page 620 of Coal Age of Oct. 9, 1919 John L. Boardman is quoted as saying that out of 300 would-be mine-rescue men at the plant of the Anaconda Copper Mining Co. only about 60 were found physically fit. What Mr. Boardman actually said in reply to a question as to what percentage of the men came up fully to the qualifications he had enumerated was that "out of 300 men trained about 60 really came up to all the qualifications."

Effect of Sulphur in Coal Used in Ceramic Industries*

By C. W. Parmelee†
Urbana, Ill.

SYNOPSIS—*For the burning of clay products, regardless of kind or variety, a low-sulphur content in the fuel employed is desirable. Of course, low sulphur is not as important in the burning of ordinary brick and tile as when making porcelains or sanitary ware. The sulphur of the coal in the form of an oxide attacks various constituents of the clay or of the decorating pigments, causing a variety of troubles that are here enumerated.*

THE ideal fuel for burning ceramic wares is the one that, among other characteristics, has little or no sulphur. For that reason wood was long considered the most desirable fuel, but its high cost has practically eliminated its use except in regions where it is abundant or other circumstances warrant its choice. The fuels commonly employed are natural and producer gas, oil and coal. The last named is undoubtedly the most important, not only in this country but abroad. Occasionally anthracite is used, but the larger part is bituminous.

The quality of the coal used depends on the kind and the value of the products being manufactured. For some materials, such as common brick, hollow block, etc., the quality of the coal is of less importance than in the manufacture of polychrome terra cotta, pottery, porcelain, etc. It is obvious that in burning clays that contain appreciable amounts of pyrite, marcasite or gypsum, as is the case with many common clays, the sulphur content of the fuel is of little importance.

The permissible amount of sulphur in the coal used will depend on the kind of product being manufactured. "A good sample[1] of coal commonly used in pottery ovens has something like this quantity of sulphur":

	Per Cent.
Total sulphur	1.20
Sulphur in the ash	0.11
Volatile sulphur	1.09

This is based on English pottery practice. Correspondence with a number of leading manufacturers in this country has brought to me the following figures:

Sanitary Ware.—(*a*) 1 per cent. maximum, (*b*) 0.5 per cent.

Sewer Pipe.—(*a*) 1.2 per cent., (*b*) 1.1 per cent. p esent run, 3 per cent. has been used.

Terra Cotta.—(*a*) 0.5 per cent. basis of contract, 1 per cent approximate.

Pottery.—1 per cent. contract, 1.5 per cent. probable content.

Enameled Brick.—1.3 per cent. maximum.

(*a*) and (*b*) designate different firms giving figures.

Since a pottery kiln for sanitary ware will require about 14 tons of coal for a burn, the quantity of SO_2 that will be generated from a 1-per cent content of sulphur will be considerable. Other kinds of wares will require much g eater fuel consumption, depending on the size and the type of the kiln and the weight of the clay products being burned.

The objections to the presence of sulphur in the fuel for clay products may be grouped as follows: The clinkering of fuel in the firebox; the action of the oxides of sulphur in waste-heat driers; the effect of the oxides of sulphur on the clays during burning; the effect of the oxides of sulphur on glazes on the clays during burning; the effect of the oxides of sulphur on glazes and colors during burning; the effect of the oxides of sulphur on burned clay products.

Clinkering is so commonly associated with a high sulphur content that it is included here. Owing to the high temperatures developed in the fireboxes of kilns, a badly clinkering coal greatly increases the labor of firing and seriously damages the walls of the firebox because of the slagging action. A mass of plastic slag settling down on the grates chokes off the air supply, preventing the maintenance of a proper excess of air in the hot gases, thus seriously interfering with the development of acceptably colored ware.

Action of Sulphur in Waste-Heat Driers

The waste heat of burning kilns may be used for drying the cruder products. The chief objection to the application of this process to a larger range of wares is the accumulation of the oxides of sulphur in the moisture on the partly dried wares and the attack of the acid water upon compounds of lime, magnesia and alkalies present in the clay forming sulphates, which subsequently appear as a white wash. Moreover, the gases taken up by the moisture condensing in the cooler parts of the drier upon the steel cars result in a serious corrosion of the framework.

A difficulty commonly experienced with high-sulphur coal is the development of "kiln white," or a coating of sulphates upon the surface of the ware. These sulphates are formed by the condensation of moisture containing sulphuric acid upon the cold ware during the early stages of the firing. This kiln white is highly disfiguring. Its formation may be prevented by a proper method of firing—namely, the passage of a large volume of air through the kiln during the period of the burn when this trouble may be expected to develop.

The color of burned-clay products is undoubtedly affected by the character of the gases with which they come in contact during the burning. The mode of attack at low temperatures has been mentioned. Investigations carried on under higher temperature conditions show that clays ignited at red heat in a stream of sulphur trioxide are attacked and that iron present will, in some degree, form a sulphate which, at a higher temperature, decomposes, leaving red ferric oxide behind.[2] Hopwood and Jackson[3] state that "experience of fireb ick make s has shown that if one side of their

*Paper presented before the Chicago meeting of the American Institute of Mining Engineers, September, 1919
†University of Illinois.
1 Mellor: Trans. Eng. Cer. Soc., 6,71.

[2]Hopwood and Jackson: *Trans.* Eng. Cer. Soc., 2, 95.
[3]*Loc. cit.*

kilns be exposed to a fresh breeze the combustion of coal on that side being thereby rendered more complete, the bricks obtained from this part of the kiln are always of a deeper color than the remainder, because in this part of the kiln the sulphur is not completely oxidized and not available as a decomposing agent for the clay substance."

The same authors[4] explain the red specking of white earthenware as due to the contact of the ware with ferruginous sand that, during the early stages of the firing, is attacked by the acid vapors giving rise to the formation of ferric sulphate. This ferric sulphate is subsequently decomposed with formation of a speck of red ferric oxide on the surface of the ware.

Other phenomena of a similar sort are discussed by the authors, all of which are attributable to the action of sulphur trioxide formed from the sulphur of the fuel.

Seger[5] calls attention to the action of sulphur trioxide in the development of a red color in the burning of limey clays which normally give a cream or dirty white color. He showed, by analysis, that the yellow centers of the brick contained 0.61 per cent. SO_3, while the red outside coat contained 8.49 per cent. of the same.

Blistering is the most common manifestation of the action of sulphur gases. The trouble probably has its origin in the absorption of acid fumes by moisture and the condensation upon the glaze during the early stage of the burn. The sulphuric acid thus deposited attacks the glaze constituents, forming sulphates that later, at a higher temperature, are decomposed and cause the development of the blisters and pimples. The trouble will manifest itself in the parts of the kiln where the circulation of the gases is somewhat retarded. The method of prevention is to maintain a proper circulation of air through the kiln during this period of the burn.

Blebs Left by Escaping Gas

A piece of ware may have a perfect surface when it is removed from the glaze kiln, but subsequent heating to a much lower temperature causes gas to escape from the glaze, leaving small blebs. The kind of escaping gases and the causes operating to produce this phenomenon are not well understood but it is quite probable that sulphur dioxide and sulphur trioxide are the offenders.

These gases may have been absorbed and held in solution or they may be liberated by the dissociation of sulphates in solution. Pelouse[6] has shown that mirror glass may dissolve up to 3 per cent. sodium sulphate and hold it in solution without losing any of its transparency, although there will be a frost-like opalescence upon its surface. A similar phenomenon may be observed with glazes of certain types. If glasses or glazes so saturated are supplied with more silica, the formation of blisters will follow. Glazes, glasses and slags can absorb considerable quantities of gases which may be liberated again. Moore and Mellor[7] found that a frit (a glass) absorbed from 4.7 to 5.7 c.c. of coal gas, which could again be set free, collected and burned.

Slags may contain a large quantity of gas. Johnson[8] states that it may be seen passing off in large volumes when a ladle of slag is quickly dumped and that it ceases as soon as the slag ceases to flow.

[4] *Loc. cit.*, 98. *Abriz der Thonwaarenindustrie, Kerl;* 497, 1871.
[5] "Collected Writings," 1, 364. Easton, Penn., 1902. Chemical Pub. Co.
[6] Seger's "Collected Writings," 646.
[7] *Trans.* Eng. Cer. Soc. (1909) 7, 7.
[8] Johnson: Principles, Operation and Products of the Blast Furnace, 217. New York, 1918. McGraw-Hill.

The influence of the oxides of sulphur upon the development of colors is undoubtedly great. Because of the small sulphur content of wood, it has long been considered a most desirable fuel for porcelains.

Taxile Doat,[9] one of the most accomplished of modern ceramic artists, has said "until the coming of a chemist who will obtain with coal the fresh and brilliant palette which wood affords, I will confine myself to the fuel of which I am about to speak"—namely, wood.

Edwards[10] has shown, experimentally, that sulphur gases may cause the darkening of green colors obtained with chromium. A correspondent writes that trouble is experienced particularly in the production of green and brown shades on enameled brick if sulphur gases are present in abnormal quantities.

All burners of clay products using the Seger cones as temperature indicators are familiar with the fact that when these cones are subjected to exposure to sulphur gases under favorable conditions they will show either a dulling of the surface or blistering. The blistering is due to the causes already described. The dulling of the surface with the appearance of a feathery crystalline coating is caused, according to Mellor,[11] by the formation of a layer of sulphates. The conditions most favorable for this are an oxidizing atmosphere at a temperature near the congealing point of the glaze and, of course, a sufficient concentration of the oxides of sulphur in the kiln atmosphere. He recommends, therefore, that coal as free as possible from iron pyrites be used at this stage of the burn.

The accumulation of an extremely dilute solution of sulphuric acid upon the ware during the early stage of the firing may lead to the attack and the solution of color oxides used in the decoration of the ware. In that case it sometimes happens that the soluble sulphates thus formed will penetrate the body, reaching the surface of the other side of the piece where the evaporation of the water will cause a deposition of the color and its subsequent fixation by firing. This sometimes results in a complete reproduction of the pattern on the surface opposite to its original location. Sometimes the color solution merely drains to a lower portion of the same surface where it lodges, forming an unsightly blemish.[12]

How Salt Glaze Is Developed

Salt glaze is developed by the action of the vapors of common salt volatilized in the kiln during the firing of the ware attacking and combining with constituents of the clay to form an insoluble glassy coating. It is developed on such wares as face brick, sewer pipe, conduits, chemical stoneware and drain tile. These wares are made from such suitable clays as are available and frequently contain appreciable quantities of pyrite or marcasite. The fuel used for such a purpose generally cannot be selected with the same care as is necessary in the production of the finer grades of wares. However, some care is used to obtain a coal as low in sulphur as circumstances will warrant.

The trouble most frequently experienced in the development of the salt glaze as influenced by the sulphur is similar to that already mentioned, a dulling of the glaze. Another trouble due to the sulphur gases is the formation of a surface coating on the ware of calcium sulphate, which is generally credited with preventing a proper development of the glaze.

[9] "*Grand Feu Ceramics*," 132.
[10] *Trans*, Eng. Cer. Soc., (1912) 11, 175.
[11] Mellor: *Trans.* Eng. Cer. Soc. (1907), 6, 71.
[12] Idem.

Information regarding the effect of sulphur upon burned-clay products is meager. Seger[13] has pointed out the possibility of the destruction of the surfaces of glazed brick by suphates that had their origin in the action of sulphur gases of coal used in burning the ware. This destructive action may be deferred for a long period after the manufacture of the brick. However, this may be possible only under rather exceptional conditions of manufacture as described by him.

An important phase of this problem that, as yet, has been inadequately studied, is the action of the sulphur dioxide and trioxide upon refractories such as firebrick and blocks, retorts, etc.

Electric Shot Firing in Mines

The advantages of electric firing are obvious and generally admitted. For one thing, it is safer. If a misfire occurs, it is safe to go to the face to investigate and rectify the trouble, because it is certain that the charge is not going off at all if it does not go the instant the blasting machine is operated. This saves time. In case of a misfire with cap and fuse, it is necessary to wait a considerable time before investigating because the miss may arise from a break in the powder train of the fuse or some other slight defect and there is always a possibility that the charge may go some time after it is normally due.

As to comparative cost of electric blasting and cap and fuse blasting, there is but slight difference. An ordinary No. 6 blasting cap and 6 ft. of fuse will cost within a fraction of a cent the same as a No. 6 electric blasting cap with 6 ft. wires. The objection on the part of miners to generally adopting electrical firing is based almost wholly upon the cost of the blasting machine and the leading wire. However, these items should be looked upon as first cost equipment which when properly taken care of will last a long time. That most miners prefer electric firing is proven by the fact that they often use ordinary dry cells to fire their shots. Of course, they fire but one shot at a time, and this results in great waste of time. After one of these single shots, they must return to the face, prepare another single shot and continuously repeat this operation until they have blown down the amount of coal desired.

ADVANTAGES OF THE BLASTING MACHINE

By using a blasting machine, a number of holes could be loaded and fired simultaneously and holes could be so located as to obtain a cumulative effect at the time of firing the blast. This is impossible when cap and fuse is used or, at any rate, involves considerable risk. Miners try to time dependent shots by cutting the fuse to different lengths, but all practical blasters know that fuse cannot be depended upon to burn exactly uniformly. As a result, it frequently happens that a shot or hole intended to follow some other shot actually goes off ahead of it. This may cause complete failure to obtain desired results, may add more or less heavy expense in the loss of explosives or may even result in a shortage of coal for the following day's work.

Such chance of failure can be avoided only in one of two ways: (1) The use of a blasting machine; (2) by using delay electric igniters. However, the latter increases the cost of production and unlike the blasting machine, the cost of delay igniters is not a first cost; it is a continuing cost from day to day.

Payment for one death or serious injury under an employers liability law would involve an amount that would provide blasting machines for even a large mining operation for years. If considered from that standpoint alone, it would undoubtedly pay mine owners to supply their miners with blasting machines.

However, there are many other reasons applicable to the subject, among them increased output because of the saving in time involved.

Miners and operators should get together on this subject of electric blasting. Their interests are common and unquestionably some way could be agreed upon whereby electric blasting could be universally adopted in the coal mines of the United States.

[13] "Collected Writings," 376.

Coal Situation in Canada

United States Consul Felix S. S. Johnson, reporting from Kingston, Ontario, under date of Nov. 7, 1919, states that Canada's main sources of coal supply are, roughly, four in number. The Pacific coast is supplied from Nanaimo, Wash., and to some extent Alberta; the prairie provinces receive their logical supply from the Alberta and British Columbia mines; sections of eastern Canada are taken care of by the Nova Scotia fields; the chief supply and almost the entire amount of anthracite coal comes from the United States. As the density of population and industrial development is highest in Ontario and Quebec, a coal shortage in the United States seriously affects this section.

The coal situation on the Pacific coast and in the maritime Provinces may be dismissed as being reasonably satisfactory On the prairies a serious shortage exists. The fuel year in the Alberta coal fields commences on April 1. Last year, (1918) which was by no means a record year for coal production in western Canada, there had been shipped between April 1 and the second week in September. 1,313,421 tons of "commercial" coal as distinguished from coal for railway service. In the same period of the present year (1919) only 529,522 tons of "commercial" coal had been shipped. The volume of railway coal was equally low by comparison.

Legal Department

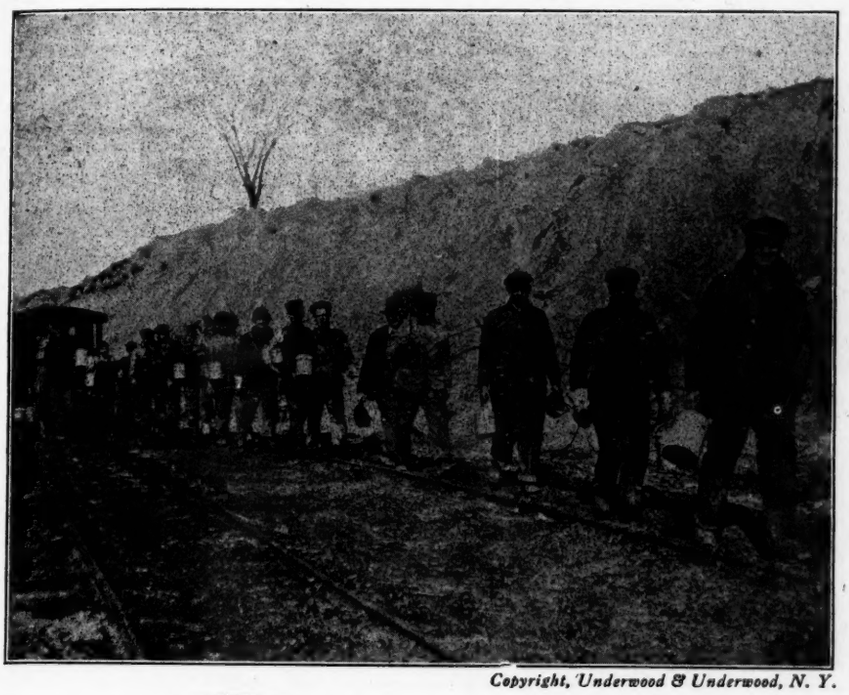
ALABAMA MINE PROP LAW INTERPRETED—The Alabama coal mining act fixes a duty against persons operating coal mines in the state to supply sufficient props and other timbers useful for propping in a mine for the benefit of those working therein. Interpreting this statute, the Supreme Court of the state holds that it is not limited to the benefit of direct employees of an operator. The duty extends in favor of every person rightfully working in a mine, regardless of whether he is an employee of the operator or some one else. But, notwithstanding failure to furnish props as required by the law, it is open to an operator, on being sued for damages for injuries to a miner, to show that the accident was due to the injured man's own carelessness. (Spann vs. Corona Coal and Iron Co., 82 Southern Reporter, 444.)

VIOLATION OF MINE SAFETY LAWS—Where an Oklahoma coal miner is injured through insufficiency of props furnished for his use on request, as required by the Oklahoma statutes, the employing operator will not be permitted to escape liability in damages on a theory that the injured man expressly or impliedly agreed to assume the risk of injury. "To permit owners or managers of mines to avail themselves of such an assumption of risk by its employees would be, in effect, to enable them to nullify the statute, and that is against public policy"; $8,423.33 was not excessive recovery for injuries sustained by a miner, through negligence attributable to his employer, where it was shown that the plaintiff was 46 years old, and had earned $5 daily, and that his hips were crushed, his right leg crushed and partly paralyzed, and, suffering continued pain and being required to use crutches, he had been unable to work for two and one-half years. (Oklahoma Supreme Court, Schneider vs. Whitehead Coal Mining Co., 183 Pacific Reporter, 49.)

SNAPSHOTS IN COAL MINING

Kansas City Miners Return to Work

After an absence of five weeks beginning Nov. 1, 1919, the union coal miners returned to work. The bituminous coal supply of the country was completely tied up as a result of their action. Kansas and the surrounding region suffered considerably, though its difficulties were somewhat lightened by the use of coal commandeered by the Railroad Administration. The return of the men gave the entire country much relief.



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Mr. Robinson, former assistant to chairman F. N. Hurley, of the United States Shipping Board, and special shipping representative at the Paris Peace Conference and later a member of the United States Shipping Board, has been named by President Wilson to represent the public on the commission newly appointed to settle the coal strike.

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Mr. Keenan, a member of the United States Employees' Compensation Committee and former vice president of the International Machinists' Union, acted in the capacity of a "liaison" officer between the many leaders of the mine workers during the conference at Indianapolis and Washington.

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Kansas Volunteers in Coal Stripping

In the left foreground may be seen Adjutant-General Charles I. Martin of the Kansas National Guard, and Labor Commissioner John Crawford watching students of the Kansas Agricultural School digging coal in the Reliance Mine No. 1., near Pittsburg, Kan., during the recent coal strike and famine, which was severely felt.

Conditions in the French and Belgian Coal Fields

By George S. Rice
Chief Mining Engineer
U. S. Bureau of Mines, Washington, D. C.

SYNOPSIS:—German coal fields are the most important on the Continent. Seven per cent of France was invaded by the German troops. In accordance with the terms of the Peace Treaty, Germany must supply France with coal to replace the loss in production due to the destruction of the mines in France. Problems confronting the French engineers are large.

THE Germans in planning a campaign for world supremacy had as one of their first objectives the seizing of the important Briey iron ore deposits of France and the coal fields of Belgium and northern France.

Large resources of coal and iron have led to the commercial greatness of the countries possessing them as exemplified by the great development first in England then in the United States, and, in Germany when the minette high phosphorus iron ores became useful through the invention of the Thomas and Gilchrist dephosphorizing process in 1878. However, this development was anticipated by the German scientific advisors in 1871, and led to the then known deposit of minette ore in Lorraine being taken from France to Germany.

When these ores became available, Germany made such tremendous strides their own minette ore developments were insufficient and they had to import ore. Meantime France, by drilling, had established the extension of the minette ore field into French Lorraine. Then it was discovered that France had greater resources while the German resources were being rapidly depleted.

Although Germany in its Westphalian basin possessed the most important coal field on the Continent, which contained the largest resources in coking coal outside of Great Britain, its coal was distant from the sea coast, so it could not be an important factor in the export business. No doubt this fact caused the German Imperialists to look forward to securing the coal basin of Belgium and northern France for future ocean trade.

It was a striking feature in the German conduct of the war that although the steel and iron plants of Belgium and France, and other industrial establishments in the invaded regions of Belgium and France were utterly destroyed, that the iron mines in French Lorraine were not destroyed nor materially damaged by the Germans in their retreat, while the destruction in France continued until the day of the Armistice. The other striking fact is that the coal mines of Belgium were not destroyed. It can only be conjectured whether this was due to President Wilson's threat of retribution, which did not stay their hand in France, or was due to the fact that they did not consider Belgium as a real competitor. Whereas it was evident they wished to cripple France industrially when they could not hold these northern provinces.

The provinces invaded by the Germans, while representing only 7 per cent of the area of France, were most important industrially to that country as 30 per cent of the industrial output came from the invaded provinces prior to the war.

The coal in the Pas de Calais-Nord field, latterly known as the Lens basin, is the best coal in France and the basin contains its largest resources. The production of this field was 28,000,000 tons out of a total French production of 41,000,000 tons. The consumption in that year, 1913, was 62,000,000 tons, so that France had to import 22,000,00 tons, chiefly from England, but some from Belgium and Germany. The coke made in the Pas de Calais-Nord field was important to the welfare of the iron and steel industry of France. In 1913, 2,873,000 tons were produced in that field and largely used in Lorraine. The largest steel plants of France were located in the Briey Iron District and adjacent districts of Lorraine and these are the plants destroyed by the Germans.

The invasion of the French coal basin began Aug. 24, 1914, immediately following the Battle of Mons, which is a short distance across the line in the Belgian coal field, and from which the British retreated south towards Paris. After the Battle of the Marne trench warfare was resorted to. The line passed north and south across the coal basin through mining towns whose names are made famous by the fighting, although the towns have utterly perished. The line extended from Arras, the headquarters of the coal field although some miles south to the basin, through Souchez, where was the famous sugar refinery around which fierce fighting occurred, through Lievin, Loos and La Bassee, at the north edge of the field.

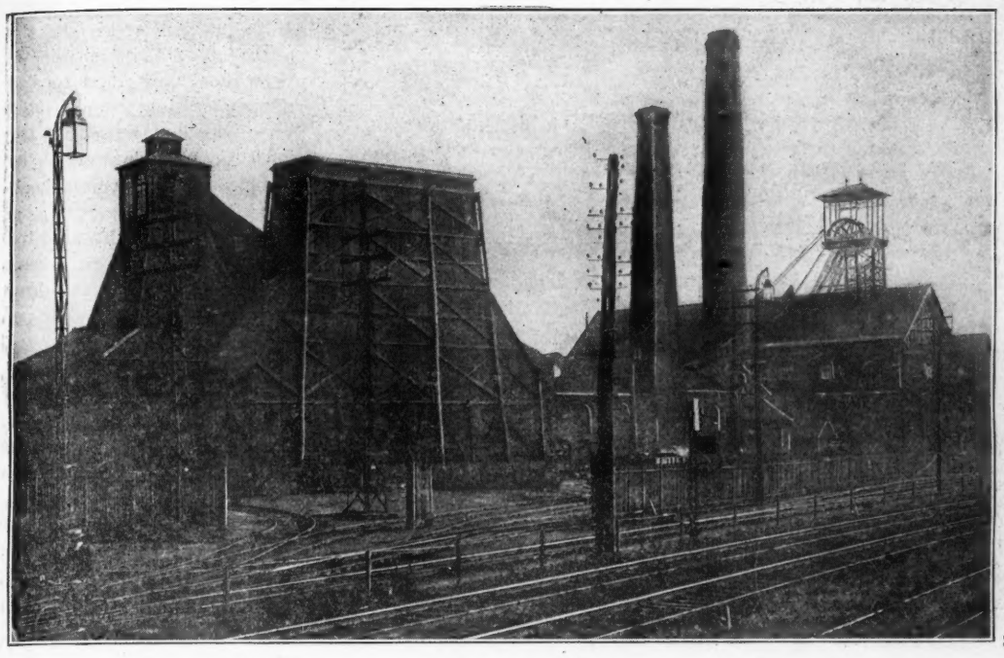
Later the British gradually driving back the Germans secured Vimy Ridge. This line, south of the coal basin, then partly surrounded Lens, commands a view over the low lying coal field. But northward the German line held. When the Germans made their last advance in the Spring of 1918, the British line gave way further north, but held firmly at Lens, although crowded back at the north edge of the basin to the outskirts of Bethune.

In the Summer and Fall of 1918, came the final drive of the allies which forced back the Germans first slowly then rapidly into Belgium where they were saved by the Armistice. While the retreat of the Germans was going on, they found more time to systematically destroy the French mines and this destruction continued to the very day of the Armistice.

Three-fourths of the coal field has been occupied by the Germans, and mines destroyed which produced in 1913, 20,000,000 tons (metric). Probably not over 1/5 of this destruction could be attributed to battle or military necessities.

Splendid surface structures generally built of steel, iron and concrete were blasted down and many of the shaft linings were ruptured by explosives, allowing the mines to

Mr. Rice was a member of a Commission sent by the Secretary of the Interior to France to investigate developments in mining and metallurgy under stress of war conditions, and also to observe the extent and character of the destruction of the collieries and the steel and iron plants, and methods which were being taken to reestablish them. This commission consisted of Dr. F. G. Cottrell, Chief Metallurgist of the Bureau of Mines, Mr. Frank H. Probert, Dean of the University of California Mining School, and Mr. George S. Rice, Chief Mining Engineer of the Bureau. While conducting this investigation a trip was made to the Saar Basin to observe the conditions there. Following this Mr. Rice acted as advisor on mining matters to the Representative of the Economic Council in an Interallied conference held at Cologne in April 1919, and subsequently visited the mining districts in central and southern France, Belgium, and Great Britain.



MULOT MINE AT HENIN LIETARD BEFORE THE GERMANS CAME

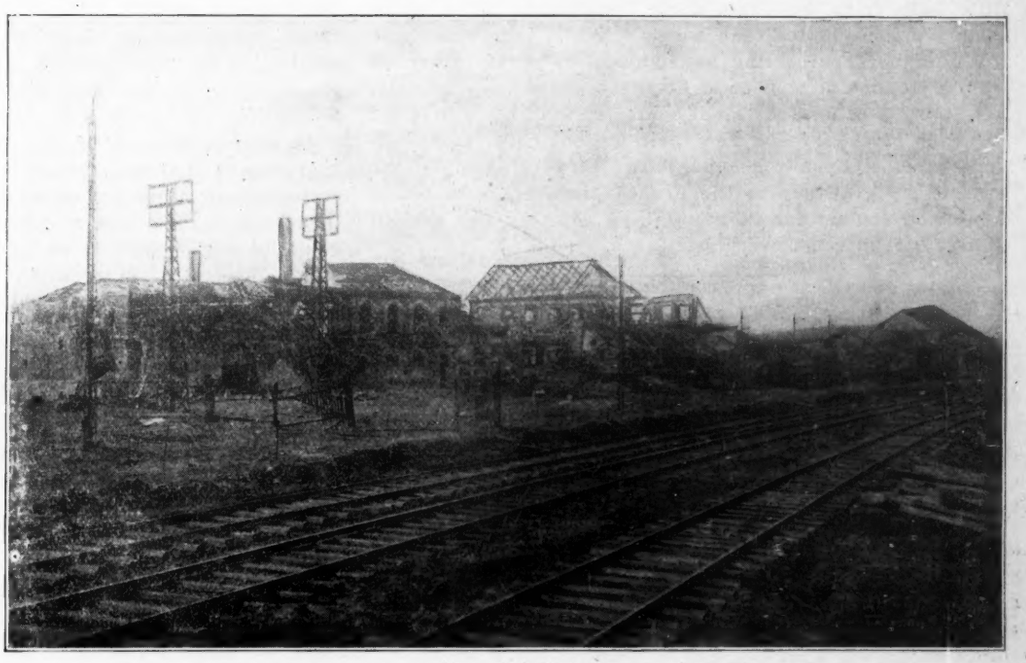
fill with water. Most of the shafts in the French field had to be sunk through quicksand or water bearing chalks and marls which necessitated the use of the freezing process or of the cementation method. Hence, when the iron linings were broken, water would run in freely, but this was not enough to suit the Germans and in some instances, they ditched in surface swamps and ponds.

It was estimated by the Courrieres Colliery management that in their mines twenty million cubic meters of water had run in. Pumping this would roughly be equivalent to hoisting 20,000,000 tons of coal.

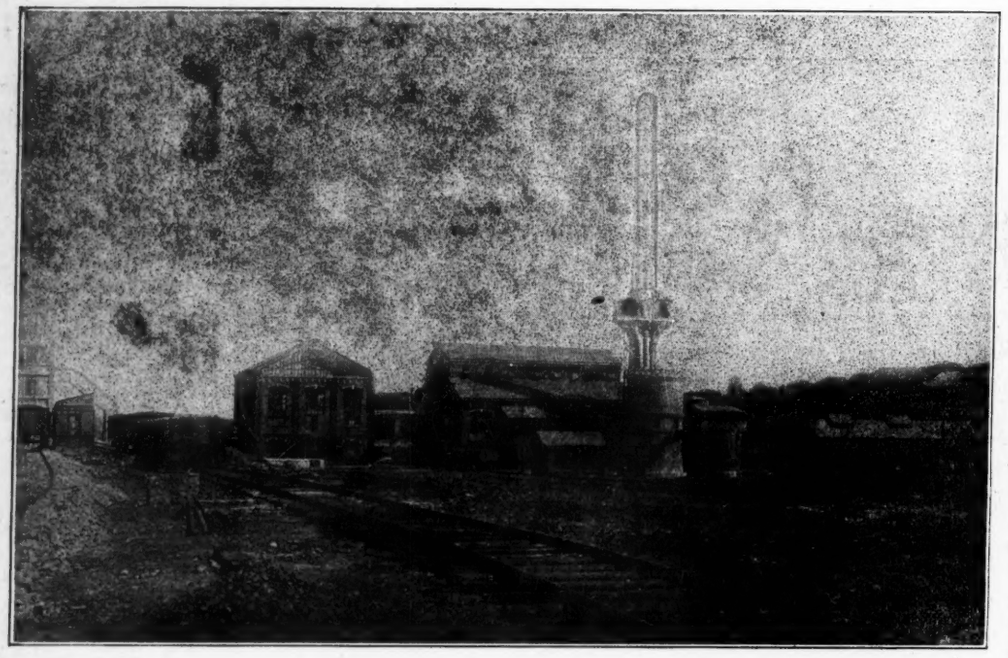
The Central Committee of France has set forth striking figures of destruction. Two hundred and twenty pits or shafts had been rendered unusable for several years. All surface installation had been destroyed in detail. An annual production of more than 20,000,000 tons or 50 per cent production has been temporarily at least lost to the country, and a working population of 100,000 people has been reduced to unemployed and they and their homeless families to extreme poverty . Material damages equal to at least 2,000,000,000 francs (on pre War Exchange basis $400,000,000). This is without counting the loss to France of 100,000,000 tons of production including by-products in the five years of occupancy of the field by the Germans. So France today pays heavily for coal it must use. It is commonly thought that the giving over of the German fiscal mines in the Saar Basin would help the situation.

The Saar Basin in 1913 produced 17,000,000 tons of coal including that produced in Lorraine annex and Bavaria, the fiscal mines producing 12,000,000 tons, a large part of which is used locally. The French Commission at Atlantic City estimated that only 7½ million tons would be available for use outside of the Saar

The Treaty of Peace states that in the next five years, Germany should deliver to France coal the equivalent of the annual production of the mines she destroyed, not gratis however, but to be paid for by France at pit head price paid by the Germans but not exceeding the exporting price of English coal, and for the succeeding five years a maximum of 8,000,000 tons. Also the treaty of Peace says that Germany is to continue to furnish France the normal quantity received before the War, 7,000,000 tons. In theory France should receive from Germany and the Saar Basin 34½ million tons, but as yet, Germany has not furnished this quantity of coal, and the Commission stated that France could not count on more than 15,000,000 tons of German coal in 1920. As regards to the reconstruction, the technical procedure as to methods of recovery of mines had not been announced in April 1919. The decision of an official Commission was being awaited. There were difficulties to be overcome in starting work and poor means of communication. There were meager railroad facilities and it was necessary to lay branch lines and bridge the numerous canals. These damaged canals are now serious obstacles to transportation. Another factor is that while a great army of workers are needed there are no suitable



MULOT SURFACE PLANT AFTER THE GERMANS HAD RETREATED



CENTRAL ELECTRIC STATION NEAR BRUAY

quarters for them. Former refugees are drifting back in little pathetic parties trundling their goods on baby carriages and carts seeking places in the ruins, cellars and military dugouts. Prisoners have been employed to some extent but chiefly in gathering shells and barbed wire.

On account of the difficulty in getting supplies, the Government has found it necessary to purchase all supplies and distribute them pro rata There has been reluctance on the part of the Government to buy mining machinery outside of France, on account of further depreciating their currency.

The shafts are deep and workings are extensive and connected with those of other mines. Therefore, it is necessary that the shafts shall be recovered to prevent the water from continuing to drain into the mines, but it will require some very rich engineering work to accomplish this.

The French engineers are very capable and they need little help from an engineering standpoint. They know their problems better than we do. While they appreciate the offers of engineering assistance, this must rather be from a standpoint of general help, especially financial help.

I desire to express my great appreciation of the wonderful fortitude of the French and their present cheerful acceptance of most appalling conditions. In conclusion let me express my gratitude to the French engineers with whom I came in contact for their unfailing courtesy and evident desire to render me every assistance.

Hydraulic Flushing of Mine Workings

(*British Correspondence*)

AT the Wigan Mining College in England, on Feb. 15, 1919, an address on the subject of "Hydraulic Stowing in Collieries" was delivered by J. Drummond Paton, before the Students' Association. Mr. Paton said almost any material could be used in hydraulic stowing (or flushing), except that which dissolved on coming in contact with the water used in flushing it into the mines. But even material which would become a mud could be used provided the time of disintegration was not inside the time necessary to get it down into the mine. At some collieries on the continent of Europe, special preference was given to any rubbish which would disfigure the surface. In the event of sufficient flushing material not being available at the collieries, empty coal cars might bring the flushing material back to the mines. Where flushing was done properly there was no need for timber to be left in.

Mr. Paton claimed that flushing was the means of beautifying the land, there being no need to disfigure it any more than was necessary. He described how he had seen miners working away at the face while the flushing process was in actual operation. He had seen statues and models carved out of the flushed material, had been brought to the surface a few weeks after the material had been stowed below ground; also, he had seen figures over the doors of engineers' offices carved out of this flushed material from the mine.

In one mine Mr. Paton visited on the continent of Europe, although there was a bad floor, "creep" was unknown because the advance of the coal face was so quick and the time consumed so low, the flushing material being passed from the crusher to the pipes, into the mine and the water off it again, in two or three hours. He had seen pumps of 2000 hp. pumping the water back to the surface.

A great deal of money was spent in the early stages of hydraulic flushing, but after spending the money it was found that the system was economical. The timber employed where hydraulic flushing was in operation was only used temporarily, the props being withdrawn wherever possible. Where the inclination of the seam would allow drainage, all objection to the flushing system was practically removed. Mr. Paton caused some laughter by saying he proposed to develop mining on the flushing principle, whereby coal could be brought out of the mine by the same water which had carried the flushing material to its destination in the mine.

As regards the cost of this system of flushing, Mr. Paton said that if a system was developed on a sufficiently large scale the cost of coal could be brought down quite low, especially where there was an adequate supply of material that could be easily crushed and flushed. He instanced a case where the cost of flushing was 9c. a ton of production, the material used in flushing coming from glass works and the waste from chemical works. In some instances the cost had been as high as from 49 to 61c. per ton, but it was not altogether a question of the actual cost of flushing. In a mine where flushing was in operation the air was as fresh below ground as on the surface; in fact, if anything, it was sweeter. In the Lancashire coal field (given a reasonable supply of material) there was no reason why the cost of stowing should not be brought down to 12c. a ton.

The consumption of coal in the lump meant terrible national waste, and in his opinion the future of coal mining did not lie in the recovery of the maximum lump but in the recovery of the maximum quantity. In the future the value of coal would depend on its volatile qualities and on results attained by its use. He was not one of those who questioned the

practicability of obtaining oils and fats from coal. It had been done. In America extensive research was going on in this direction. One day we should have to use our coal with the intention of getting out of it all that there was in it; when we did that we should mine small coal and mine by machine, and machine mining, he hoped, would improve the work of the miners and make the part underground easier than it is at present. Mr. Paton's proposal was that collieries should be run entirely mechanically.

Mr. Paton, who is perhaps the highest authority on hydraulic flushing in Great Britain, invited questions from the audience. In reply to a member who wanted to know if it would not require a great amount of pressure to stow hydraulically in a mine 200 yd. deep and with the seams pitching 1 in 9, he said the limit of flushing was a 50-yd. rise. In such a case a borehole was often put down and a tunnel driven up to it, or a cross drift higher up. There were hundreds of these little tunnels in the German coal fields.

Asked whether the excessive friction of the flushing material on the pipes was not a big expense, Mr. Paton said it was surprising the amount of wear there is in a ⅛-in. pipe. It had, however, been found in practice that a round pipe wore out so as to form an egg-shaped bottom; so an egg-shaped pipe was used and a liner put in the bottom with the result that the wear was on the liner. The life of the ordinary pipe was fairly long and the cost was not an excessive item. In an installation carrying 50 tons a day, say, the pipes would have about ten years' wear, and the pipe system in such an installation would rarely exceed $7000 or $7500, or say $1500 a year; if 50 per cent. more coal was obtained, this would soon pay for the wear of the pipe.

In regard to the question of stoppage in the pipes, the lecturer said in single-line systems there was very rarely a stoppage at all. They might go on for years and never have a stoppage. The first likely trouble would be from leakage through the wearing of the pipes, but even leakages were quite rare. There were junction systems, but no two were worked at one time unless arrangements had been made for a bigger main pipe in the shaft.

FLUSHING AND ITS RELATION TO OUTPUT

Mr. Paton informed a member that he did not defend hydraulic flushing for every case, but what he did claim was that hydraulic flushing was being extensively practiced and that it lent itself to the developing of mining on a simple and sound system. A big output could be obtained by its use, and a mine in 20 or 30 years would be as good as when it was started; whereas in some cases a mine might have to be closed in ten years where this system was not in use and the coal had to be won quickly and cheaply. A mixture of chalk or lime in the stowing material had a cementing effect, and he instanced one case where blasting had to be resorted to to make a road through a flushed area four or five months after the material had been sent down the mine.

Mr. Paton interested his audience by saying he believed that hydraulic flushing had its origin in an incident at a small mine on the Howarden estate in Flintshire, the seat of the Gladstone family. An outcrop was mined and a little brook carried sand and mud and other material into the mine, flushing it clean up so that it had to be abandoned. When pumping was resorted to later, it was found that the flushed material was dry. He honestly believed that this was where hydraulic flushing came from. The man who tried to push the system was a Welshman who went mad in his efforts to get the mining people interested so that they would adopt hydraulic flushing. This man made the journey to the United States, but here there was so much coal that they could afford to waste it, so he made the return journey across the Atlantic, took the idea to Germany, and Germany perfected the system of hydraulic flushing.

American Machinery in Demand at French Mines

The Lens coal-mining district in France is the center of interest in mining machinery circles. Other mines have been wrecked by the war, others have been overworked to the point where extensive repairs will be necessary—but the problem at Lens overshadows them all. At this, the greatest French coal-producing point, all the machinery may be said to have been wrecked by artillery fire or demolition charges placed. The mines have been flooded, not from the surface but by wrecking the casing of the shafts. At least two years will be consumed in pumping out and repairing the shafts. In the meantime French machinery manufacturers are making a special effort to be ready with whatever new machinery may be required.

French mining engineers are familiar with American practice. Undoubtedly inquiries will come to America for machinery that can not be supplied in France and it would be well for Americans to keep in touch with the Comptoir Central d'Achats pour les Regions Envahies on this subject. Among the inquiries that have been received pneumatic locomotives have been prominent. Some Americans may not realize that French practice does not permit extensive blasting, the use of undercutting tools, and other American methods designed primarily to increase tonnage. The French problem is to avoid unnecessary waste either above or below ground.

Under the terms of the treaty, the Saar Valley mines will serve France for the next few years. Although the supply of coal and iron ore will be short, this arrangement will tide over the crisis and will make it possible to proceed methodically with the rehabilitation of the mines that otherwise would be essential to the life of industry.

American engineers have been to France recently making a careful study of the probable French requirements. French engineers have been to America looking after their needs and some of the larger French concerns even maintain permanent offices in America. Opportunities, therefore, should be well known to those in position to take advantage of them.

A consular report states that work in connection with the mine and track scales has been continued in different sections of the country, and six men are now employed in this field of work. The mine scale trucks have operated in the states of Tennessee, West Virginia, and Kentucky, while track scale-testing equipments have covered the states of Kentucky, Michigan, Minnesota, North Dakota, Montana, and Washington. Recently a member of the bureau's staff attended a meeting in New York with representatives of the American Railroad Association and the scale department of the Pennsylvania Railroad, in order to discuss the subject of track-scale specifications. As a result of this conference it has been proposed to add to the committee of the American Railroad Association, a representative of the Bureau of Standards. It is hoped that when this committee is organized it will form a means whereby progress in the securing of accurate weights on railroads will be very much expedited, and all railroads will be induced to adopt types of scales and weighing rules which will result in first-class weights.

Coal soon will be available to the mines in the Fairbanks district of Alaska. The railroad connecting Fairbanks with the Nenana coal field is practically complete. Mining operations in the Fairbanks district have been greatly curtailed in recent years because of the depletion of timber supply which could be used for fuel.

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Is this Our Forefather's Land of Equal Laws and Opportunity?

EMPLOYEES ARE ALLOWED, and in fact have been invited by Government officials, to join in combinations which, in turn, seek by creating public distress and discomfort to raise unreasonably the price of their product—labor. Yet employers are forbidden to combine, even where the price of their product is not raised thereby or is so maintained that only a fair price is secured.

Employees are allowed to deny the right to work to any employees who are not members of their combination. Employees in other instances are denied by other employees the right to join a combination and to work at an industry of their choice, and employers are, in some instances, bidden by their employees to refuse work to those who are not members of the combination yet it is well known that employers are not allowed to thus monopolize any industry.

Employees when combined are seeking to secure as a right the privilege of breaking contracts and are seeking that their combinations be not held accountable for the misdoing of members or of the combination as a whole, while combinations of employers are held responsible for their acts as a body, and for the acts of individuals where the combination is chargeable with having instigated their illegal acts.

Employees believe that they have unbounded rights to strike, but demand that employers shall not have a right to lock out their men.

Employees demand that they be allowed to refuse their services but they require that no one shall deny those thus striking the right to continue in the houses they have rented, the right to buy of whom they will and the right to have trust extended to them.

Employees are in general, allowed to seek high wages by means of combination, while employers in the coal or food-stuff industries may not accept a higher price even when freely offered and when obtained without combination.

Is this America? If it is the America of today it is a country of privilege. The outcome of privilege is almost sure to be abused, and the people suffer. The danger menaces, not the rich so much as the poor, for one of two things happens.

Either those employees who secure the privileges cause prices to rise and make employees in other industries suffer, or they reduce profits and create such losses that industries lose more than they gain, and the industries become poor and cannot grow. In fact they may cease to continue in operation.

Unprofitable industries eat up the product of the past faster than they create product and soon nothing is left. Suppose in a good year a farmer plants and is allowed to gain a crop only a fifteenth (6⅔ per cent.) more than is planted. Next year he plants as much as the year before and the crop fails and he loses all he plants. Where will he be? Will he be able to plant again? So it is with industry, it must gather in good years and in good ground much more than it sows or it will have no seed to sow after bad years and little if any left to sow if some falls on poor ground. Every man must balance large profits against big losses or he will have little left, and little left means a poor country.

This house is Tom's and that is Jack's; the other is John's and one belongs to Arthur. But if Tom and Jack and John and Arthur let their houses burn or rot away and do not rebuild, paint, repair and enlarge them, soon there is no village. If 100,000,000 Toms, Jacks and Johns and Arthurs all spend more than they can save, a nation is soon without the accumulation of its toil and where is that nation? Where, if this is the case, will be America?

If the sun of our political life prevents more than a 6 per cent. profit where will we get seed for future planting after a summer of drought? Is it right to restrain the frugal farmer from taking the full product of that part of his field which being "good ground" yields "some sixty and some a hundred fold", and let him bear the whole loss on the wheat that falls upon stony ground and takes no root. Usury is taking big return with no risk; where the risk is large the return must be large, or the capital invested will dwindle as ice in mingled cold nights and sunny days.

Why Government Salaries Should Not Be Raised

NO DEGREE OF INTELLIGENCE, only a formula from the book of public sentiment, is needed to prove that the employees of the Government should not receive any increase in pay, despite the increased cost of living. All that is necessary to prove the proposition is to take as a postulate something which is so often stated and so generally believed that it must surely be true. It runs thus:

When a service is necessary to the public and when the costs of that service increase, the parties rendering that service should find some way of meeting the increased cost without raising the cost of the service to the "dear" people.

It would be a folly to show how essential is the work of the Government official. It is clear that, if we had no Government, the right to pursue happiness would be denied us. The Government guarantees to us that we will get food and fuel at near cost or at cost or less than cost so that we may pursue not only digestion and warmth with success but may have money left to obtain many other things which bring accidents, and headaches and short sleeping hours in their train.

The Government certainly is most necessary to the public and therefore its cost should not be increased. Government officials should unflinchingly meet the increased cost of operation by strenuous economy and skillful contriving.

It has been observed that officials in the service look prosperous. The officials themselves, it is true, allege that this is due to their frugality, good taste and to their skill in the art of economy, but their appearance is so like to their reprehensible profiteering brethren that a little question must always arise in the minds of the public. Not being possessed of the qualities listed, outsiders must wonder that so much can be done with such a modest income.

So long as Government officials serve the public so well and essentially we must narrowly watch their efforts to improve their status. Even now it is said that they are trying "to pass the buck" of higher living cost to the

ultimate consumer, and it is rumored that they have selected and sent out an agent—a "sinister agent" is the expression universally approved in such cases—who is trying to find out whether the ultimate consumer is not faring much more generously than they.

The public must object to any such inquiry (1) because it will show that Government officials are not paid nearly as well as men of equal or lower achievement and (2) because many of the officials in civil life are not nearly as useful as the Government men and therefore not being public utilities should be allowed to get anything they can set their minds or their hands on.

All of which is quite clear. Is it not?

We usually pay for value received. Generally speaking the one who tries to collect more for his services than those services are worth in the open markets of the world is doomed to failure from the very start.

A Generation Without Achievement

WE, THE PEOPLE of this generation, can not pride ourselves on the railroads we have built for our fathers who constructed the trunk lines of which we are so proud have given place to us who do not continue their work. Some superanuated railroad builders may remain, relics of a dead past. They stand like the solitary peaks that mark the mighty strivings of a prior era.

The United States introduced the electric street car system, which extended itself in a network on and around every city and even invaded the country. Its progress is now backward. Lines are being abandoned and the service of such as are still operating is being restricted. No longer have we any glory in our street-car system. No luxury industry is so mean that it cannot point with disdain at the elevated, street-car and subway service of the country.

Other utilities are not quite so severely curtailed, but none of them are progressing as triumphantly as in the past. In a short while, if we do not prove more generous, we shall find that not a single public utility is growing as fast as the need for its service. The cold hand of poverty will palsy the progress of all of them. No investor will take any bonds and the refunding of those bonds that reach maturity will be impossible.

There will result a land of many theaters, of roads made impassible by joy riders and highways cut up and cluttered by auto busses and motor trucks which latter can give better service than electric roads because allowed special privileges, the choice of runs and the stimulus of large profits. The old public utilities will be in an indigent class while luxuries and new types of public utilities will be in another and a prosperous class, till the new utilities suffer in their turn from a similarly drastic control.

For this reason the public utilities should stand together—the railroads, the street traction interests, the coal mines, the flouring mills, the packers, the electric power stations, the gas companies and like industries. They should fight as one, not for their privileges but for their rights. They are the cast-off spouses of the American people. When they were first seen they were courted and feted. Cities prided themselves on their utilities. Now the public has gone after the courtesans of traffic, and is willing to allow adequate reward only to those trades which cater to its folly.

Note the bill 11,339 introduced by Representative Charles H. Brand of Georgia on Dec. 19 last in which a dealer or any person regularly engaged in the business of selling foodstuffs and fuel is required under pain of a term of servitude, not less than one nor more than 20 years in the penitentiary, to sell these goods when he is offered reasonable and market prices. What this means is of course questionable. The market price may not be reasonable, and the reasonable price may not be that of the market.

If the coal man is to be held liable to imprisonment if he does not sell at the market price then he cannot mine and store coal, for if the price temporarily goes below cost he must accept the price which nets him a loss and lose his storage costs, labor, power, machinery depreciation, coal degradation, rent, stealage, fireloss and all other charges. He must sell his coal no matter how great the loss. Perhaps this is not meant by the author of the bill, but if the emphasis is to be put on the word "reasonable" and not on "market" why add the latter word which makes the matter ambiguous.

But why make it apply only to fuel and foodstuffs, unless the intention is to relieve the luxury trades from legislation? Class legislation was rampant before the war. It grew during the conflict. It is the supreme menace of the future.

The socialists openly assert that they will trap and starve the public utilities first and then when these utilities are without further power of resistance they will drag them into their own camp. They are trapping and starving some now and others are progressively getting into such an anemic condition that the socialists are ready to drag them home.

The railroads and the traction companies are already almost docile, and the mines and the power companies will follow soon. It is time that public utilities cease to quarrel with one another and band together to obtain a small measure of justice. If control is just for one man, it is just for another. The yard stick should be 36-in. long whether it measures cloth for James, the dry-goods man, or for John, the dealer in a public utility.

Strike May Raise Clothing Cost

When the coal strike occurred it made several plants run short hours and so prevented the garment workers and the woolen and cotton mills from working at high pressure. That will mean less clothing. When there is a shortage of dry goods, every retailer is bidding for the wholesaler's output, and prices go up. The retailer can charge what he will and be sure of selling. A strike of coal miners, therefore, decreases the production of clothing and makes it scarce and expensive, giving trouble to everybody, for we all need clothes.

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

The Vicious Circle

Letter No. 1—The trend of the times is clearly indicated in the issue of "Coal Age" for Oct. 2, 1919, which recently came to hand. First, there is the poem by Rufus T. Strohm, which is the Foreword in that issue and deals with the now popular phrase, The Vicious Circle. This is followed, in the Discussion Department, by the several letters dealing with Prices and Wages, Wages versus Work Hours, and Bolshevism in America.

Though each and all of these contributions tell the same story, one fact seems to have escaped the several writers; namely, the manufacturers and producers of the necessities of life are themselves responsible for the perpetuation of the so-called Vicious Circle. Granting the demand for increased pay, shorter hours and other radical requests made by labor everywhere, the producer and manufacturers alike pass on the buck, so to speak, through increased prices and profiteering.

In the coal industry, for instance, one observes either a feast or a famine. When the demand for coal is at its highest, as it was during the war, the miners have steady work and earn good wages, while the operators take advantage of the opportunity to retrieve the losses of slack periods. The price of fuel soars, the increase being attributed to the law of supply and demand. This may not be justly called profiteering, but rather, good business; but let us look further.

LABOR AS A COMMODITY

How is it with labor, which is properly a commodity? In the slack period the earnings of the miner grow less and less. He works one or two days a week when the operator can get cars to load and has the orders for shipments; but the good Lord is supposed to look after the miner the rest of the time. When business picks up his services are again in demand. Now, if he lays off a day or so, a trick he has learned from his enforced idleness at other times, he is called a slacker, his loyalty to the industry is questioned and every expedient is used to make him put in as many hours as possible at the face of the coal.

The question arises, if labor is a commodity, which is generally acknowledged, why may not the miner take advantage of the same law of supply and demand, which avails the manufacturer and producer? Can he be blamed for asking an increased price for the commodity he is selling, the productive effort of his hands' labor? Does the demand for an increased wage by labor, justify the worker being called a Bolshevist, a radical, dyed deep in the wool? In the meantime, the price of coal goes higher and a like rise takes place in the price of all commodities whose manufacture requires fuel.

Notwithstanding the attempts made from time to time to becloud the true situation, reason compels the admission that every man is entitled to three things, in return for his labor; namely, food, clothing, and shelter, to which should be added a suitable amount of recreation and amusement. If his labor does not bring these things to the honest toiler and a small profit besides for the so-called rainy day and the frost of old age, what right has capital to ask for more and greater returns on its investments.

What has become of the Brotherhood of Man, the Golden Rule and other teachings of the Great Disciple, as embodied in the words, Do unto others as you would have others do unto you? Shall the greed of rapacious individuals, who are by far in the minority, be allowed to make life harder and harder for the workers who constitute the vast majority of mankind? When the futile, ineffectual attempts of workers to rise above the conditions that threaten to engulf them fail of their object it is not surprising that men resort to strikes.

I cannot agree with the statement of Jospeh R. Thomas, page 588 of the issue of "Coal Age" to which I have referred. In speaking of the decline in money value, he states, The principal cause for this condition can be traced to so large a class of workers who have fallen victims to Bolshevik activities. Mr. Thomas evidently knows nothing about the inflation that money has undergone and which is, more than anything else, responsible for the decreased purchasing value of the dollar, at the present time.

COST OF LIVING CAN BE LOWERED

But, returning to our subject, why ignore the truth, especially when it is backed by justice? The Vicious Circle, the trouble and turmoil, the present industrial strife and unrest, are not only the natural reaction of war conditions but a natural protest against the profiteering indulged in by those who control the means of production.

The cost of living can be lowered and the worker satisfied, though it may take more to accomplish this, at the present stage of affairs, than would be required had a more humane policy been followed in the beginning. Production can be increased and the price of living lowered if employers will make an earnest effort to bring this about. Here is the suggestion, and I pass it along for what it is worth.

During the war, the government fixed the price of coal, and operators still made money. The same can be done in respect to other commodities at no great loss to producers but the curtailing of extortionate profits. Strikes penalize both employers and employees and the entire nation suffers. The strike of coal miners in Great Britain cost that country over $50,000,000. Employers in an industry that does not function for any length of time lose far more than what they would sacrifice by cutting down their margin of profit and sharing it with their employees.

At the present time, any increase granted workers is added to the cost of production, and the price of the product is increased. The increased price of raw material to the manufacturer is passed on to the merchant, as is also any increase due to higher wages paid in the shop or factory. Again, the merchant selling the product of the factory adds to the price his share of profit. The result is that the increase is passed on to the ultimate consumer, who must eventually bear the burden.

It is well to remember, however, that the ultimate consumer is not only the worker whose labor has produced

the goods but the original producer, the manufacturer and the merchant. All are paying the high prices they themselves have created by the large profits claimed in the business of producing the raw material and making and selling the goods. In other words, as is so well illustrated in Mr. Strohm's poem to which I have referred, like the pup, each man is chasing his tail and the result is the vicious circle. Let each of us study carefully the situation and decide for himself wherein lies the remedy.

Pittsburgh, Penn. MACK WILLIAMS.

Promotion of Ambitious Workers

Letter No. 6—I read with growing interest the letters Fairplay, "Coal Age," Aug. 28, p. 375, and that of Richard Bowen, Oct. 9, p. 628, on the subject of the promotion of ambitious workers. The letters brought to my mind a Foreword that appeared some time ago in "Coal Age," Vol. 11, p. 461.

The foreword, which was entitled, What Was Wrong, dwelt at considerable length on the circumstance of a man who served one coal-mining company continuously for 61 years. After 27 years of service, in different capacities, he secured a position as engineer, which he continued to hold the remaining 34 years of his service, and was then retired on a pension.

The writer seemed to convey the idea that, because this man had made a good engineer, hoisting the same loads, guarding against the same dangers and carrying the same responsibilities, he had been held by the company in that position all these years without being offered promotion. Perhaps, it would even have been refused, if asked. Evidently, the man was an efficient engineer and gave excellent and satisfactory service, and I believe we are justified in concluding that he was well satisfied with his job and would, in all probability, have refused a higher position had it been offered him.

ATTITUDE OF MANY WORKERS

In my opinion, sooner or later, most men find the station or position in industrial life for which they are particularly fitted and best adapted, and when that is the case, they seldom have any desire to go higher. Many good men shrink from the added responsibilities of higher positions than those they hold and are quite content with their lot.

With comparatively few exceptions, the general run of workmen are seeking positions and occupations where the work and its responsibilities are light. It is true that some workers have the ability and qualifications to fill high positions in the industrial world, but the vast majority are not so qualified. When they advance so far, they reach their limit.

In my opinion, the fact that a man is proficient in any one line is a good and sufficient reason for retaining him in that work. It is not a reason why he should be promoted; nor is it evident that he would prove equally proficient in a higher position. Long and faithful service in one position does not always fit or qualify one for a higher place. As in the Foreword mentioned, a man may make an efficient and faithful hoisting engineer who would prove a failure in the position of mine foreman.

I would be a great mistake, to my mind, to promote a man for no other reason than his long service in the employ of the company. Such promotion would often elevate a man to a position for which he was not qualified, while the same man would have filled an under position with success.

What has been claimed as a discouragement to ambitious workers in coal mining, is equally true in respect to all other industrial pursuits. Locomotive engineers pull and push the same levers, look ahead along the same rails, see the same scenery, and count the same miles of run year after year, with no expectation of ever being made superintendent of the road, though it is possible some of them would be capable of filling the place. A railroad company needs the services of their good engineers at the throttle. They have other men who are not engineers, but whose training is fitting them for the position of superintendent or manager. It is only reasonable to assume that, under like circumstances, we would follow the same course in the promotion of men to those positions for which their training fits them.

All young men entering the coal-mining business cannot expect to become superintendents and managers of mines any more than all school boys can hope to become governors and presidents, and the same is true in respect to all industries. I believe it is safe to say that as many miners have been called from the pick and shovel to higher positions, as is true of men who served behind the counter and later gained the manager's desk.

DIGNITY OF HONEST WORK

A miner, with black face and hands can do just as honest and faithful work, as the man who wields the pen or handles goods of delicate texture with white hands. The work of the former is just as honorable as that of the latter. Someone has said, It is not the employment or station that brings honor to the man; but the man brings honor to the position he holds, by the way he performs his work.

Circumstances over which men have little if any control often affect their advancement. At times, a man will leap by a single bound from obscurity at the bottom of the industrial ladder to a place of prominence at the top. Such instances are particularly in evidence in political affairs.

In coal mining, the ambitious miner studies to fit himself for the position of fireboss or mine foreman. It may happen that, in a large mine, there are three or four of such miners who are applicants for the same position of foreman, which has been recently vacated. It is quite clear to anyone that all of them cannot secure the position. The appointment can only go to one and the rest are disappointed. At such times, we are apt to hear the cry of favoritism, which may or may not be the case. Such cries generally come from the men who are least worthy and competent to fill the place.

Many workers are ambitious for promotion to positions they are not qualified to fill, but which they desire for the honor that goes with the appointment. Many miners imagine that mine foremen have an easy time and do not realize the responsibilities that rest on their shoulders. If they did, some of them would not be as anxious to secure the place.

Dayton, Tenn. JOHN ROSE.

Finding a Mine Door Set Open

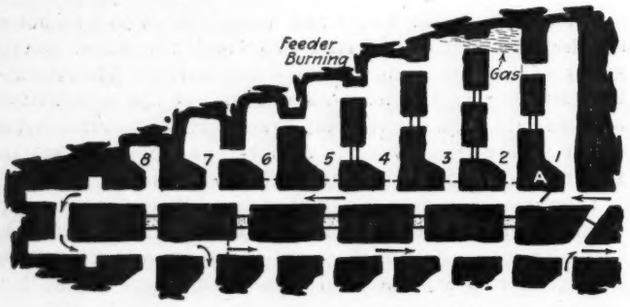
Letter No. 14—The question raised by Richard Bowen, as to whether it is the best and safest method for the fireboss to start his regular morning inspection of a mine on the intake air, or to begin at the return end and proceed against the current, submitted to the readers of "Coal Age," in the issue of Sept. 11, p. 462, is bringing out some interesting replies.

As the geological formations, in different mines, vary widely in both extent and general conditions, it seems to me that, in most instances, this matter can be solved best by the judgment and experience of the fireboss, who must be thoroughly acquainted with the natural conditions in his mine. If a fireboss feels that it is just as safe to go one way as the other, let him go the most convenient way.

As a general rule, however, I think the examination should begin with the intake current. My reason for thinking so is that all gases swept from the faces of the chambers are carried ahead with the air, and the place is left clear. On the other hand, if the examination is started at the return end of the mine, the gases swept from the chambers ahead of the fireboss might have a tendency to accumulate in the chambers behind, which he has just examined, in case the air current was weak.

Finding this particular door set open would indicate clearly to the experienced fireboss that he had no circulation in the entire intake side of the mine, and any gases found accumulated in the faces of the chambers, could not be removed until the circulation was restored. The fireboss would also assume that the open door would not affect the circulation in the return section of the mine.

Now, as has been suggested, had this door been left open by some careless driver, at about the time the shots were being fired and remained open up to the time the inspection was made, if the fireboss started his examination on the intake side of the mine he would discover quickly on entering Chamber 1 that something was wrong with the circulation; but if he started the inspection on the return side he would not detect anything wrong, until he had reached Chamber 7, on the intake side. Neither would he be apt to smell the smoke from the burning feeder, until he passed through the crosscut between Chambers 6 and 5, where he would find the burning feeder and try to extinguish it.



ASSUMED GASSY SECTION TO BE EXAMINED

In case the smoke from the burning coal was so dense and hot, because of the little air passing, that the fire cannot be extinguished, the crosscut between Chambers 3 and 4 must be closed and a stopping built on the entry between Chambers 4 and 5 so as to deflect the air current up Chamber 4 and through the crosscut to the face of Chamber 5, which would clear out the smoke and cool the chamber so that the feeder could be approached and extinguished. The stopping in the crosscut may then be removed and the inspection continued to the end of the section, after which the door may be closed and the circulation restored.

In his letter, "Coal Age," Oct. 9, p. 627, Andrew O. Bain, tells how he would remove the gas from Chambers 2 and 3, which is very good, except that he fails to close the crosscut at the face between Chambers 3 and 4. If this crosscut is left open when the door on the entry is closed and the circulation restored in these three chambers, in my opinion, there would be danger of enough gas-laden air passing through Chamber 4 and coming in contact with the burning feeder in Chamber 5 to be disastrous.

Again, it may not be definitely known in what chamber the burning feeder is to be found. Suppose, instead of its being in Chamber 5 on the intake side, it is in Chamber 8, near the face of the heading, on the return side. In that event, I think Mr. Bain would run a great risk in sweeping out any considerable amount of gas and sending it on along the gangway to this burning feeder. Judging from the figure or plan given, the mine is evidently a small one and the distance from the mouth of Chamber 3 to that of Chamber 8, is not so far but that there might be more or less danger in sending gas in that direction.

While acting as fireboss, in a very gassy mine that was being worked altogether with safety lamps and in which a part of the circulation came through another mine that was also gassy, I recall an instance when a pump got out of repair, in the other mine, and the water rose until the air passing into our mine from that quarter was cut off, which allowed gas to accumulate in the other mine. When the pump was started again and the water lowered sufficiently to permit the air to pass through to our mine again, our safety lamps were knocked out, for a distance of more than two thousand feet from where the gas had accumulated.

To say the least, it is a very uncomfortable situation to find a burning feeder and an accumulation of gas in the mine at the same time, more especially when the air is passing from the gas toward the feeder. To leave the door open, as Mr. Bowen says has been his custom in gaseous operations, and proceed with the examination, until it is ascertained that there are no burning feeders in the mine, I think is the proper course to follow. But if the inspection is made with the door set open, beginning on either the intake or the return side, and any accumulation of gas is found in the unventilated section of the mine, a second inspection will always be required after closing the door.

Now, in conclusion, permit me to say that to lay down a fixed method of inspection that will apply alike to every mine, would be a difficult undertaking. Conditions vary and the nature and formation of mines differ widely, and a method that might be practiced with a reasonable degree of safety, in making the examination in one section of a large mine, possibly could not be followed in another mine. As I said before these things should be left to the judgment of the experienced fireboss.

A long experience as fireboss, has led me to be guided largely, in making the inspection, by the condition of the mine. Sometimes I would prefer following the intake and in other cases would start in the return. However, in all gassy mines where accumulations of gas are expected to be found and must be removed, the intake should invariably be followed; and a door set found open, short-circuiting the main current, should not be closed, until it has been ascertained that there are no burning feeders in the mine.

Dayton, Tenn. JOHN ROSE.

Acetylene Safety Lamps

Letter No. 1—During recent months "Coal Age" has developed most interesting discussions regarding firebossing, rescue work, and rescue appliances for use in mines. It would seem, howver, that the question of illumination, which is of so great importance to coal mining, has not received the consideration it deserves. The same remark will apply also to the excellent work of the Bureau of Mines, which has been instrumental in creating a growing interest and has received the hearty coöperation of mining companies, in the organizing and equipping of well-trained rescue crews in mining districts.

In the matter of illumination, the electric lamp has been generally considered as an essential equipment of all rescue stations. Most rescue crews are equipped partly with electric lamps and partly with safety lamps burning naphtha or oil. Though both have their merits, these lamps have often been found wholly insufficient in respect to the light they give for penetrating the dense smoky atmospheres commonly met in fighting mine fires when wearing breathing apparatus. When such atmospheres dense with smoke and fumes are encountered, the lamps mentioned are practically

worthless, the oil-burning lamp being often entirely extinguished, while even the electric light fails to penetrate the obscurity.

It is a recognized fact that if a rescue crew is to work efficiently, the best possible light must be given them. Without it, the workers cannot proceed intelligently, but must hesitate and lose confidence in themselves, and perhaps be unable to keep their bearing. All of these are imperative in rescue work and largely depend on the presence of a strong light that is able to penetrate the gloom.

In nongaseous mines, the open carbide lamp has long proved its value in respect to the illumination it affords. The fact that the acetylene safety lamp, which adapts the carbide light to use in the presence of gas, has not been recognized in connection with mine-rescue work and adopted as part of such equipment, can only be explained by assuming that this lamp is not widely enough known. The acetylene safety lamp has been proved to be reliable and safe. It is sensitive to gas, though not quite in the same degree as a naphtha-burning lamp, but far more sensitive than the common Davy. burning oil.

ADVANTAGE OF ACETYLENE FLAME

Acetylene safety lamps give a very bright and steady light, but what is of equal importance is the fact that they require very little oxygen in burning, which makes them particularly suitable for mine-rescue work, which must be generally performed in atmospheres deficient in oxygen, where oil-burning safety lamps would burn dim or be entirely extinguished.

It is thus clear that the disadvantages of both oil-burning and electric lamps, for such work, are overcome by the use of the carbide, gauze-protected lamp, known as the acetylene safety lamp, and it would seem that their adoption as a standard lamp for rescue stations is of the utmost importance.

In the same connection, it can be said that this lamp should find an important application in the work of the fireboss or mine examiner, whose duties are manifold and of grave importance in relation to the safety of lives and property. In making his inspection of the mine, the fireboss must observe carefully that the working places are free from every danger. For that purpose, he must have a light of the greatest illuminating power.

At present, many firebosses are obliged to carry two lamps; an electric lamp and a safety lamp, for testing purposes. In my opinion, the acetylene safety lamp furnishes considerably more light than both of these lamps together, and accomplishes both purposes for which it is necessary to carry the two lamps.

It is my belief that the use of the acetylene safety lamp in firebossing would not only facilitate the work of firebossing, but make it possible to do it more thoroughly. There is, of course, no need to emphasize here the results of making an efficient inspection of a mine.

Charleston, W. Va. PROGRESSIVE.

Storage Battery Locomotives

Letter No. 1—A reference that I saw recently in "Coal Age", in regard to the improvement of mine equipment as emanating largely from the users of such equipment, reminds me of an incident that shows that this is particularly true in regard to the use of storage-battery locomotives in mines. This type of locomotive is being constantly improved, and these improvements generally come through the suggestions of users that are worked out by the engineers in charge of their manufacture.

An order was recently placed with one of the large manufacturers of storage-battery locomotives, for a locomotive to be furnished with two complete batteries, in removable battery boxes. The order requested specifications on a battery that would be suitable for operating a mining drill. It was explained that the drill was to be run durin the night and driven by a 3-hp. motor. The idea was to run the drill from a locomotive battery, the drillman using the locomotive to move his drill from place to place.

It was explained that this would do away with the necessity of operating the power plant, at night, solely for the purpose of running the drill. The fact that the locomotive was to be equipped with two complete batteries, in removable boxes, would make it possible to do this, since one battery could be charged during the day, while the other battery was in use on the locomotive. The work of changing the batteries would only be a matter of 10 minutes.

The concern that manufactured the locomotive had previously had no idea of the varied service to which the machine could be put; and the request of this operator was a revelation to them. As the old saying goes, necessity is the mother of invention. In this instance, it was the necessity of running the power plant during the night, for the sole purpose of operating the drill which work was performed by the nightshift, that gave rise to this suggestion and which unquestionably broadened the application of this type of locomotive in mining practice. Similar varied uses of other equipment are brought out, from time to time, that would be overlooked were it not for the necessity that brought them to light.

AUTHORITY OF SHOTFIRERS

Only recently I learned of a similar instance where a portable pump had been used to pump the water out of a few low places at different points in a mine. Although this work required but a few hours, it was necessary to be done in the early morning, just before the beginning of the day's run. Previous to the installing of a storage-battery locomotive in that mine, it had been necessary to employ a nightcrew to operate the power house, to supply the necessary power for running the pump.

In this case, also, the locomotive was equipped with two batteries, and the pumpman used the locomotive, both to move his pump from place to place and to operate it for pumping the water out of the places where it had accumulated. Instead of employing the nightcrew and the pumpman itwas only necessary, now, for the latter to come out early in the morning, take the locomotive and proceed with his work.

In the use of storage-battery locomotives, complaint has been made, at times where the work was very severe, that it was impossible to get a full day's work from the battery. Equipping the locomotive with two sets of batteries, as just mentioned, overcomes this difficulty also.

During the period of the war, when machinery of any kind was at a premium and operators were compelled to take anything that they could get, it was impossible to furnish batteries that would not show signs of deterioration after a limited service. Also, there was a general falling down of some of the cheap chain-driven machines that were then put on the market. This class of machinery, naturally, deserved severe criticism, although all of the trouble cannot be ascribed to the batteries employed, but much of it was often due to the inferior machine the battery had to operate.

The stress of war work is now past, and the larger manufacturers of mining equipment are devoting more time to the perfection of the machines they put out. This is particularly true of the storage-battery locomotive that is so well adaped to the work of gathering coal at the face that it is now rapidly coming into its own.

Ashland, Ky. J. A. S.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Authority of Shotfirers

Kindly permit me to ask for the opinions of "Coal Age" and its readers in a disputed question that has arisen between the miners and the shotfirers employed by the Norton Coal Co., at this place.

To explain, our loaders prepare their own powder in two sticks, while the shotfirers tamp and light the shots. Some of us have refused to fire shots prepared in this way by the loaders, claiming that even when using a copper-tipped tamping bar there is a liability of the bar striking a spark, by coming in contact with a sulphur ball.

The miners want the shotfirers to tamp the open powder. They say that if the powder is put in the hole without opening the end there is a vacant space left between the two sticks, which is liable to cause one stick to fire first; and if the second stick fires it will do so later and cause a windy shot.

The refusal of the shotfirers to fire such shots caused the miners to take the matter up with the Mine Committee, and the result was that the mine foreman, at the request of the committee, ordered the shotfirers to fire the holes. The committee held that there was no danger to be feared of a windy shot resulting from this manner of charging the holes. It was stated further that the Examining Board of Illinois had recommended that method of shooting. However, this did not satisfy the shotfirers, who still refused to fire the holes.

Again, let me ask: Should a mine examiner decide that a hole is not safe to fire, has the Mine Committee any authority or right to demand that he shoot the hole? If the judgment of the examiner differs from that of the men, who has the right to decide the matter?

Nortonville, Ky. SHOTFIRER.

Assuming that black powder is used, or even permissible powder, and made up in two sticks with open ends, so as to bring the powder of the two sticks together, there is some question whether such a charge can be inserted into the hole without more or less of the powder being scattered along the hole. In that case there is every possibility that the scattered grains of powder would be ignited, in the process of tamping the hole, and a premature explosion result.

The work of shotfiring is dangerous, at the best; and it is this consideration that has caused the shotfirer to be given supreme authority in respect to what shots he shall fire, which is plainly specified in the mining laws of several of the coal-producing states, including Colorado, Missouri, Iowa, and the bituminous districts of Pennsylvania.

In the opinion of COAL AGE, this is a safe provision in respect to the firing of shots in blasting coal in mines. It is only logical to allow that the person firing a shot should be permitted to use his own judgment as to its safety. In other words, where a company, or the miners working in a mine, employ men to fire their shots, they place themselves in a position that compels them to submit to the judgment of those they employ, since no man can be expected to willingly risk his life through the whim of another.

Therefore, let us conclude that no man or committee of men can demand that a shotfirer accept their judgment in jeopardy of his own life; and, in this respect, it is our opinion that the shotfirer should be protected by the state mining laws or mine regulations. In the performance of his duties the judgment of the shotfirer should be supreme. It will be of interest to learn the opinions of shotfirers on this question.

Widening an Airway

The air-course in our mine is 5 ft. in height and 10 ft. wide. The volume of air passing is not sufficient for the development of the mine, and it is proposed to increase this circulation by widening the airway, the height remaining the same, because the coal is only 5 ft. high and we do not want to brush the roof or lift bottom. At present, the mine is passing 150,000 cu. ft. per min., and it is desired this quantity to 200,000 cu. ft. per min. Kindly show the method of calculating the width of airway required to produce this result, assuming the power on the air remains unchanged.

Oliphant Furnace, Penn. JOHN H. WILEY.

The first step in the operation is to write the equation for power, expressed in terms of the airway and the quantity of air passing; thus,

$$u = \frac{k\,l\,o\,q^3}{a^3} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Now, disregarding the factors u k l, all of which are constant, it is observed that the quantity (q) varies directly as the sectional area (a) and inversely as the cube root of the perimeter (o). In other words, the quantity ratio is equal to the area ratio, times the cube root of the inverse perimeter ratio, which is expressed as follows:

$$\frac{q_2}{q_1} = \frac{a_2}{a_1} \times \sqrt[3]{\frac{o_1}{o_2}} \quad \ldots\ldots\ldots\ldots 3$$

Now, since the height of the airway is to remain unchanged, the area will vary as the width (w) and the perimeter as the sum of the height and width (h + w). Hence, we can write for Equation 2 the following:

$$\frac{q_2}{q_1} = \frac{w_2}{w_1} \times \sqrt[3]{\frac{h + w_1}{h + w_2}} \quad \ldots\ldots\ldots\ldots 3$$

Substituting the known values for their respective symbols in equation 3, $q_1 = 150{,}000$; $q_2 = 200{,}000$; $w_1 = 10$; $w_2 = x$; and $h = 5$; we have,

$$\frac{200{,}000}{150{,}000} = \frac{4}{3} = \frac{x}{10} \times \sqrt[3]{\frac{5 + 10}{5 + x}} \quad \ldots\ldots\ldots 4$$

Then, cubing each side of the equation, transposing and simplifying, we have, finally,

$$\frac{x^3}{5 + x} = 158; \text{ or } x^3 - 158\,x = 790 \ldots\ldots 5$$

The value of x in equation 5 is found most easily by trial. For example, trying successively $x = 12$, $x = 13$, $x = 14$, it is finally found that the value that will satisfy equation 5 is practically, $x = 14.5$. Therefore, to produce the desired results, the airways must be widened $14.5 - 10 = 4.5$ ft., or 4 ft. 6 in.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Mine Examiner's Examination
Springfield, Ill., Nov. 11, 12, 1919

(*Selected Questions*)

Ques.—What kind of oil is used in a Davy lamp?

Ans.—The oil burned in a Davy lamp is usually sperm, cottonseed or lard oil. These are frequently mixed with petroleum in proportions varying from one-third part of the latter to equal parts of both, for the purpose of increasing the illuminating power of the lamp.

Ques.—What percentage of marsh gas can be detected with a Davy lamp?

Ans.—Many firebosses can detect the presence of marsh gas when but 2 per cent. of the gas is present in the still air of a chamber or room. Others often fail to see a cap in 2½ per cent. of gas. Most firebosses have no difficulty in detecting gas when 3 per cent. is present in the air current flowing in an entry. It is always easier to observe a flame cap in still air than in a moving current.

Ques.—What is a regulator and when can it be used to advantage?

Ans.—A regulator is a device for distributing the air passing in two or more splits so as to proportion the air supplied to each split according to its needs. In other words, a regulator is used to obtain a different distribution of air from what would be produced if the air current was permitted to divide naturally between the splits.

A regulator can be used to advantage when the natural division of the air gives more air in one split or district and less air in another than what is required. This always happens when the splits are of unequal length, since the longer split, where the greater number of men are generally at work, naturally takes the smaller proportion of air, while the shorter split working fewer men receives the larger proportion of the air. To overcome this, a regulator must be placed in the shorter split, which has the effect to increase the resistance in that split and force some of the air to pass through the longer split.

Ques.—If there was 30,000 cu. ft. of air passing in the return airway, and this quantity contained 3½ per cent. of marsh gas, how many cubic feet of gas are there?

Ans.—The quantity of gas in the return current, in this case, is $0.035 \times 30{,}000 = 1050$ cu. ft. per min.

Ques.—Where would you expect to find the following gases, in making an examination of a mine: Firedamp, blackdamp and whitedamp?

Ans.—In the examination of a mine, the fireboss expects to find the different gases mentioned, accumulated at the roof or floor, or at the face of a rise or dip, according as their density is less or greater than that of air. For example, the specific gravity of firedamp, which is an inflammable or explosive mixture of marsh gas and air, is generally less than that of air or unity; and firedamp is therefore to be found accumulated at the roof or in rise workings. Likewise, blackdamp has a specific gravity greater than unity and is to be found accumulated at the floor, or the face of dip workings or other low places in the mine.

It happens, at times, that these gases are generated in such quantities in certain places in the mine that there is little chance for their accumulation according to their densities. For example, firedamp may be generated in considerable quantity at the face of dip workings or in other low places in the mine; or blackdamp may be coming from the roof in rise workings, being generated in a worked-out overlying seam, or finding its way from other sources through crevices in the roof. In such cases, the specific gravity of the gas is no indication of where it is to be found, until it has had an opportunity to accumulate in a still atmosphere.

Whitedamp (carbon monoxide) has a specific gravity but slightly in excess of air (0.967), which would cause this gas to accumulate at the roof or other high places, if it was present in sufficient quantity in the mine. However, that is never the case, under normal conditions of working. Whitedamp, being the result of combustion of carbonaceous matter in a limited supply of air, must be sought in poorly ventilated and abandoned places in mines, or in the return from a mine fire.

Ques.—State by what means firedamp, blackdamp and whitedamp can be detected in mines. Also, say which of these gases is more easily removed and which the more difficult to remove.

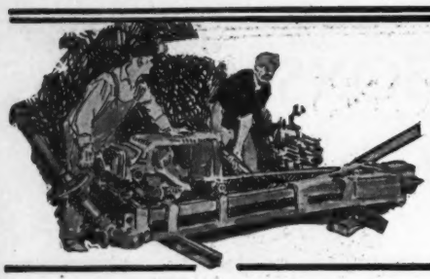
Ans.—Firedamp is detected by observing its effect on the safety lamp, either in the formation of a flame cap or by the action of the flame, which is enlarged and lengthened and often rendered unsteady in the presence of this gas.

Blackdamp is detected by observing the dim burning or extinction of the flame of the lamp, as well as by its effect to produce headache, nausea and pains in the back and limbs when a person has worked long in such an atmosphere. Whitedamp must be detected by observing its effect to prostrate small caged animals such as birds or mice, preferably the former.

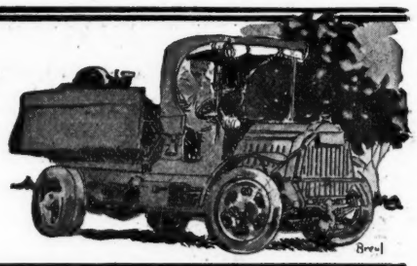
Firedamp accumulated at the face of a steep pitch or on a high fall and blackdamp accumulated at the face of dip workings, or in swamps and low places in the mine, are the most difficult to remove. When firedamp is generated at the face of dip workings, or blackdamp at the face of a pitch or in rise workings, the removal of the gas is less difficult, it being assisted by the relative density of the gas and air, which causes it to flow naturally from the place where it is generated in those cases. The removal of whitedamp will depend on the ability to properly ventilate the places where it is generated.

Ques.—The total rubbing surface of a square airway being 160,000 sq. ft., the length of the airway, 5000 ft., the quantity of air passing, 80,000 cu. ft. per min., what is the velocity of the air current, in feet per minute?

Ans.—It is necessary, in this case, first, to find the perimeter of the airway by dividing its rubbing surface, in square feet, by its length in feet; thus, $160{,}000 \div 5000 = 32$ ft. Then, the airway being square, each side is $32 \div 4 = 8$ ft., and its sectional area, $8 \times 8 = 64$ sq. ft. The quantity of air in circulation being 80,000 cu. ft. per min., the velocity of the current is $80{,}000 \div 64 = 1250$ ft. per min.



COAL AND COKE NEWS



WHAT HAPPENED IN OCTOBER

[The bracketed figures in the text refer to the number and the page of the volume in which reference to the matter noted may be found and should the reader desire further information he can obtain it in the place indicated.]

Oct. 1—The finals of mine-rescue competition of the national first-aid and mine-rescue meet is held in Pittsburgh, Penn., in conjunction with dedication of the Bureau of Mines buildings [XVI, 615].

Oct. 1 to 4—The Eighth Annual Safety Congress of the National Safety Council is held at Hotel Statler, Cleveland, Ohio, [XVI, 618 to 623].

Oct. 7—Some 3000 miners are still out on strike around Johnstown, Penn. [XVI, 657].

Oct. 10—The operatives of the Central Competitive district meet (at Hotel Bellevue-Stratford, in Philadelphia, Penn., with the offficials appointed by the United Mine Workers of America, in a wage conference [XVI, 657].

Oct. 12—The wage conference of the Central Competitive district and officials of the United Mine Workers of America adjourn without having come to any agreement [XVI, 657].

Oct. 14—Senator Myers, of Montana, denounces Congressional investigation of industrial trouble [XVI, 690].

Oct. 15—An order is issued to members of the United Mine Workers of America, in the bituminous regions of the United States, to cease work at midnight of Oct. 31, 1919 [XVI, 657]—Secretary of Labor W B. Wilson summons John L. Lewis, acting president of U. M. W., and Thos. J. Brewster, spokesman of the bituminous coal operators, to meet him on Oct. 17 at Washington, D. C. ([XVI, 657].

Oct. 17—A conference is held at Washington, D. C., between W. B. Wilson, secretary of labor; John L. Lewis, acting president of U. M. W.; Thomas T. Brewster, representing the coal operators of the Central Competitive district. A meeting was called for Oct. 21, 1919, to debate the issue in question [XVI, 690].

Oct. 21-25—Operators meet mine workers in conference at Washington, D. C., as agreed at the Oct. 17 conference [XVI, 691].

Oct. 24—From 3000 to 5000 miners meet at Charleston, W. Va., and discuss invasion of Guyan field. Governor Cornwall wires acting president John L. Lewis, of the United Mine Workers.

Oct. 24—The last Government effort to avert the coal strike fails. Even an appeal from President Wilson, to the operators and miners in conference at Washington, brings no results.

Oct. 25—President Wilson issues statement saying a coal strike would be considered a grave moral and legal wrong against the Government, and that the law will be inforced. The president requested that the strike order be recalled.

Oct. 25—Numerous strikes are on in the No. 11 district of the United Mine Workers of America. This includes most of Indiana's coal fields.

Oct. 25—Shaft A of Mine No. 1, Standard Oil Co., at Carlinville, Ill., breaks all records at the plant in hoisting coal [XVI, 763].

Oct. 28—Wiliam Benry, a prominent coal operator of southern West Virginia, dies at his home in Philadelphia, Penn. [XVI, 764].

Oct. 29—The Northeast Coal Operators' Association holds a meeting at Ashland, Ky. [XVI 762]—Fire starts in mine No. 2 of the Youghiogheny & Ohio Coal Co., at Amsterdam, Ohio. As a result, 20 men lose their lives and thousands of dollars are lost [XVI, 792].

Oct. 29—A conference of the International Executive Board, Scale Committee and District Presidents of the United Mine Workers of America, meets in Indianapolis, Ind., to consider the strike situation, especially President Wilson's request that the strike order be recalled. District Presidents and Scale Committee leave for their homes to direct the strike.

Oct. 30—The Executive Board of the United Mine Workers of America continues in session at Indianapolis, Ind.

Oct. 31—The Executive Committee of the Central Competitive field meets in conference at Cleveland, Ohio, to take action on the nation-wide strike schduled for midnight. The conference then adjourns. Troops are secretly moved to stragetic points in coal states to be affected by strike order at midnight.

Oct. 31—Federal Judge A. B. Anderson issues a temporary restraining order to prevent union officials from issuing instructions to union members' relatives to the strike or to paying strike benefits from union funds. This order was issued at request of special assistant U. S. Attorney, General A. B. Ames.

Charleston, W. Va.

Production of coal erratic during pre-holiday week. Car shortage develops the latter part of the week. Not expected to improve soon. Diversion of coal ceases. General resumption of work in Kanawha field without definite agreement as to application of 14 per cent. wage increase. Most of New River mines working without check-off system.

The production of coal reached two extremes during the pre-holiday week, in this section of West Virginia, growing at a rapid pace during the first four days of the week, only to be seriously curtailed during the last two days of the same period. The upward curve in production followed a resumption of work by miners in the southern part of district No. 17 on Monday, Dec. 15, in response to instructions from Indianapolis; the difference in conditions being most marked in the section referred to because of the fact that miners had been idle most of the time during the entire six weeks of the strike. The difference was less marked in that part of this section within the confines of district No. 29 (United Mine Workers), where miners had been at work since the first rescinding order had been issued, even though the check-off had been abolished; but even in district No. 29, there was an increase during the week ended Nov. 20, amounting to possibly 20 per cent.

On Friday Dec. 19, however, a sudden car shortage developed in this section, cutting production down to just about half of what it should have been under favorable conditions; though the shortage of cars was felt to a less extent in district No. 29, or the smokeless area, than in district No. 17. As showing the effect of the sudden car shortage, even though it had not been unexpected, loadings on the Chesapeake & Ohio dropped from 117,000 tons on Thursday to 85,000 tons on Friday, and on Saturday there were still further decreases; there was little prospect that such conditions would be alleviated during the next few weeks, at least no hope was held out by C. & O. railroad officials that conditions would be improved.

While producers and shippers in this area had experienced some financial relief through remittances received largely from the railroads, such payments were by no means general and there were still large amounts due for shipments made during the latter part of October and all of November. However, through the receipt of cash from the railroads, producers were able generally, still affected adversely by a strike.

with the further assistance of banks, to meet their Christmas payrolls.

Diversion of coal originating in this section had largely ceased during the third week of December, only a few cases of such irregularities having been reported; owing to that condition most of the coal produced in this part of the state was moving forward to oroginal consignees in the regular channels, although embargoes still prevailed with respect to coal from some of the high volatile fields and there was still an inhibition against any export shipments. More coke was also being shipped, permission having been granted for the use of open top cars in the shipment of this fuel.

General resumption of work on the part of miners in the Kanawha district, at the outset of the pre-holiday week, made for a large production in that district as long as the car supply was maintained. In fact there were a good many miners who reported for duty as early as Saturday Dec. 13, or just as soon as they received word of the settlemen effected at Indianapolis. Most of the miners, however, waited until Monday to return to work, and from that time until Friday the nineteenth, there was a steady gain from day to day in the production of the Kanawha region; but the sudden slump in the car supply forced many mines to shut down and miners deprived of an opportunity to earn as much as would otherwise have been possible in the week just before the Christmas holidays. Production of C. & O. mines in the Kanawha field by Wednesday the seventeenth, had reached 35,000 tons, but by Friday it had slumped to 23,000 tons and was still on the downward curve. Labor trouble also developed at certain mines on Coal River, but it was largely of a local nature.

Miners of the Kanawha district were at work, although there had been no agreement reached as to just how the 14 per cent. wage increase should be applied, whether on a flat basis of 70c, computed according to the scale in the Central field, or on a basis computed on the prevailing rates in the Kanawha field; there had been no agreement reached by Dec. 20, although conferences between miners and operators had been held, each side adhering to its original contentions. However that was not permitted to make any difference as to working conditions, the miners continuing at work. There was seen, however, that there might be some difficulty when it came time to meet the first payroll under the increase.

The car shortage prevailing throughout the length and breadth of the C. & O. territory during the week ended Dec. 20, affected operations in the New River field less than in other districts, there being only a small reduction of the output as the result of a car shortage. The peak of production at C. & O. mines in the New River field was reached about Wednesday, when a total of 26,000 tons were produced. From that point the output dropped to about 23,000 tons a day during the remainder of the week. It was generally believed, however, that during the last weekly working period of the month the general car shortage would overtake the New River field also.

Although district officials of the United Mine Workers in the New River field were making every effort to secure a restoration of the check-off, which became automatically abrogated when the New River miners broke their contract on Nov. 1, most of the mines in the New River field are still being operated without the check-off being in existence. Despite that fact, production was steadily increased during the greater part of the week, advancing from about 70 to 90 per cent. and dropping off a little only when cars made it impossible to load coal. Of eight mines in the New River field not in operation during the week, only two were

The movement of coal from the New River field was largely to the eastward, a large tonnage being consigned to tidewater, but none of it for export purposes. Diversion of New River coal had largely ceased and virtually all of it was going to original consignees.

Much difficulty was still being experienced by New River operators in securing financial returns for coal shipped during the latter part of October and during November.

Bluefield, W. Va.

Car shortage limits production in extreme southern fields of the state. Situation most acute in Pocahontas region. To continue for several weeks. Miners leaving field for their old homes for Christmas week. Most of smokeless coal goes to tidewater.

With empties at a premium in the extreme southern fields of West Virginia, production in that part of the state was materially decreased during the week ended Dec. 20, especially during the latter part of the week, when several of the larger operations were forced to cease even attempting to load coal for a day or so because of the absence of cars. While the shortage was more pronounced in the Pocahontas than in the Thacker and Tug River fields, nevertheless mines in the last two named fields also experienced the same difficulty in securing an adequate supply and as the week drew to a close cars became scarcer and scarcer.

The opinion was ventured by railroad officials of the Norfolk & Western, that a continuance of the car shortage might be expected for several weeks, the principal difficulty, according to their version, being the large amount of equipment in the far West which is not being returned to the territory in which it was used prior to the strike. In other words, with the resumption of operations in the West, the total equipment available is not sufficient to go round, and it is regarded as certain that western producers and railroads are utilizing much equipment belonging to the Eastern Car Pool.

Another factor in limiting production during the week ended the twentieth and during the early part of Christmas week was the absence of quite a large number of miners from their working places on account of the holidays.

The larger part of smokeless coal from the extreme southern part of the state was being moved to tidewater and other eastern destinations; the western shipments were somewhat limited. However, the car shortage has so greatly curtailed production, that producers are finding it next to impossible to catch up with their contract deliveries, interrupted by the strike.

The output of the Tug River field during the working period ended Dec. 20 dropped to 77,500 tons, and on Monday the twenty-second only 13,000 tons of coal were produced, that representing the smallest Monday's loading recorded in some time. One effect of the continued serious shortage has been to deprive a number of Tug River mines of empties for three consecutive days. The output of coal during Christmas week was expected to be quite light because of the inadequate car supply and because of Christmas week.

Throughout the last half of the week ended Dec. 20, in the Pocahontas region, the car supply was far below normal; conditions during the earlier part of the week showing little change as compared with the previous week, so that the car shortage in the Pocahontas field alone closely approximated 50,000 tons. The shortage in the Pocahontas region was particularly acute on Thursday, the eighteenth, a number of mines finding it necessary to suspend operations, while during the remaining two days of the week loadings were limited. In fact it is generally predicted that the first of the year will find the situation more serious than it is even at present. Another cause contributing to the reduction of output in the Pocahontas region, was the general movement of miners to their old homes for the Christmas week, well supplied with funds and ready to enjoy a week's holiday.

Huntington, W. Va.

Car shortage reduces Guyan production below that maintained during the strike. Output 195,000 tons for third week of month. Coal now shipped to regular customers. No diversion.

The Guyan field is winding up the calendar year with a greatly reduced production as compared with that maintained throughout the strike; the biggest factor in driving production downward has been a most serious car shortage, in evidence ever since mines idle throughout the strike resumed and began to utilize the cars in the West; although many of such cars have heretofore been used only in the Eastern Car Pool. The shortage of empties was seen in a limited output during the week ended Dec. 20, to about 195,000 tons; the car shortage cut into production to the extent of about 125,000 tons or approximately 35 per cent. as during the previous week; the labor shortage also was more pronounced.

There was a difference of 30 cars in the production for the two weeks ended the thirteenth and twentieth, respectively, the difference being downward. While there was a spurt in production on Monday, Dec. 22, it was due simply and solely to a Sunday accumulation, for by the twenty-third the car supply in Chesapeake & Ohio territory was not over 45 per cent. On the twenty-second, however, the output of the Logan field reached 40,750 tons. It was not believed that production could be kept up, however, both because of transportation and labor disabilities, although the general let-up was not expected until Christmas eve.

Considering the fact that mine workers in the Guyan field have been working at maximum speed, there has not been as much relaxation on their part as might have been expected, although, of course, a large Christmas wage was the goal of many. The car shortage, which it is generally believed by operators will be continued, is very apt to cut into the earnings of both operators and miners.

There are still large amount outstanding for coal shipped during the period of the strike, although nearly all the product of the Guyan region is now being shipped to regular customers without diversion. However, it will require a period of several months and even longer, operators estimate, before most of the companies are fully reimbursed for the large amounts it has been necessary to borrow.

While the grand total of cars handled by the C. & O. R. R., during the week ended Dec. 20, was 1554 cars in excess of cars moved during the previous week, the gain was due to the resumption of operators in areas heretofore affected by the strike; losses being sustained in those districts which during the strike had produced coal regularly.

The total number of cars of coal transported during the week ended Dec. 20 was 12,115, or about 605,650 tons of coal, as against 10,561, or 528,050 tons, handled during the previous week, a gain of about 77,600 tons.

Fairmont, W. Va.

Production of northern West Virginia fields halved by about worst car shortage of the year. Relief possible by Jan. 1. Little coal diverted and most of it flowing east again. Miners ready to work, but hampered by short car supply.

The worst car shortage of the year, with one exception (that experienced in August), played havoc with the production of coal in the Fairmont and other northern West Virginia fields during the week ending Dec. 20, cutting production virtually in two. For the first two days of the week, while it was plain that a shortage of empties was impending, nevertheless producers were able to mine and load a normal supply of coal, but by the seventeenth there were not more than half enough cars to meet requirements, even normal requirements, and consequently in many instances it became necessary to suspend operations.

The acute shortage continued throughout the last four days of the week, and on the eighteenth only about 500 cars were available for loading on the Monongah division of the Baltimore & Ohio, similar conditions being prevalent in other parts of northern West Virginia. There was, therefore, a marked difference in the production of coal as compared with loadings during the week ended Dec. 13. Hope was held out by railroad officials that it might be possible to secure the return of enough empties from eastern terminals during Christmas week, to improve the situation somewhat, but it was not thought that much of the equipment in the West would be returned in time to relieve the car shortage before the first of the year.

Those in the first seven priority classes began to receive their coal regularly from northern West Virginia during the early part of the week, two additional classes being added during the week, covering manufacturing plants on the War Industry Board priority list, and those not on that list. No coal to speak of from northern West Virginia was being diverted, and most of it was flowing to eastward again, though Michigan and Ohio markets were still receiving a plentiful supply. However, the consumption of fuel by railroads was less than it had been during the strike as indicated by the reduction in the shipments of railroad fuel.

Railroads were impeded in the movement of coal over heavy grades because of heavy snows and unfavorable climatic conditions. There was no restriction of production during the week ended the twentieth, through labor difficulties, miners for the most part being ready and willing to work, but unable to do so in large part because of the curtailed car supply. For that reason the Christmas pay envelopes were not as large as might have been the case.

Norton, W. Va.

Labor and car shortage cause most of decreased output from Virginia fields. Coal now moves freely to destination. Financial distress due to non-payment for coal.

Production in the Virginia fields during the pre-Christmas week reached a total of 162,000 tons, with production losses for the same period amounting to 45,000 tons. Of that loss 20,000 tons was attributable to labor shortage, 17,000 tons to car shortage and the balance to other causes. The best part of two days was lost by mines on the Southern Ry., while the supply on the Interstate R. R. was only about 75 per cent. of normal. Coal from the Virginia fields is now moving freely to destination and stored coal on Southern Ry. tracks is being raplidly cleared. Operators are beginning to feel more than ever the financial pressure owing to the large amount of coal confiscated, which the railroads as yet have failed to pay for, except to a very limited extent, and banks are hard pushed in their efforts to carry large accounts. On some confiscated coal to Memphis the railroads have not even yet furnished weights to operators.

Salt Lake City, Utah

Bureau of Mines investigating smoke nuisance in Salt Lake City. White panels and panes of glass placed in many sections of the city. Laboratory established. Demonstrations of firing of local coals in stoves conducted.

Investigations looking to the suppression of the smoke nuisance have been conducted for years in many of the big cities using bituminous coal. Tests have recently been made in Salt Lake City, Utah, by the United States Bureau of Mines, which directed smoke investigations, paying especial attention to soot precipitation in various parts of the city. These tests are to furnish evidence as to the injurious effects of soot upon houses and buildings. The exterior walls when defaced with soot attract more attention than do the interior furnishings, but the damage done to the latter may mean considerable loss and annoyance. Efforts made to remedy the smoke nuisance have been attended with considerable success in most of the large cities of the East and the middle West.

The Bureau of Mines smoke investigators in Salt Lake City are using specially constructed wood panels 6x12 feet in dimension and painted white. These panels are being installed in various parts of the city. One-half of each panel is covered to prevent the collection on its surface of atmospheric impurities, while the other half is exposed. By this method, after the lapse of a month or two, officials at the Bureau say that a determination can be made of the extent to which soot and other impurities circulating in the atmosphere are precipitated. It is expected that a decided contrast will be presented between the exposed surface of the panels and the half which has been covered.

The "Salt Lake City News" further states that pieces of transparent glass a foot square are being placed throughout the city, which will be examined after a time to ascertain the extent to which soot excludes light. Skylights and windows gather a surprising amount of soot and dirt, due to the smoke in the atmosphere in Salt Lake City.

A new laboratory, established exclusively for the smoke investigations, has been completed at the University of Utah, and is equipped with modern apparatus for work of this character. This laboratory is lo-

cated in the same building where the other Bureau of Mines activities are conducted. Stoves are being used in the tests here in which local coals are burned and standard methods in the firing of domestic equipment are developing as a result of these tests.

PENNSYLVANIA

Anthracite

Hazleton.—The remodeled breaker of the M. S. Kemmerer Co., at the Sandy Run colliery, north of here, recently began the preparation of coal for market, after being idle seven months. Considerable electrical equipment has been installed to facilitate handling the output.

Lykens.—Fire recently destroyed two buildings of the American Brickette Co., a subsidiary of the Susquehanna Collieries Co., with a loss of $75,000. The buildings have a capacity of 75 tons of coal a day. No coal was lost in the fire, only 15 tons remaining in the building after the days' work.

Hazleton.—The Lehigh Valley Coal Co. is arranging to mine the coal in the Porter swamp tract near Eckley. During recent years the coal from the old Eckley colliery has been sent to the Drifton breaker for preparation. It is stated that this body of coal was not worked in the early days of anthracite mining owing to insufficient top rock to permit of underground development.

Bituminous

Washington.—Shortly the Carnegie Steel Co. will begin construction of a large coal storage basin at Wilson, on the Monongahela River. It will have a capacity of more than 400,000 tons, which will be stored there in case of emergency. The basin will be 800 ft. long and 600 ft. wide and be built of concrete. According to present plans the plant will be completed by next June.

California.—The tipple at the Crescent plant of the Pittsburgh Coal Co., between here and West Brownsville, was completely destroyed by fire on Dec. 18, causing a loss estimated at between $100,000 and $150,000 The blaze, which is believed to have started from a spark from a locomotive on the Monongahela division of the Pennsylvania R. R., burned with such rapidity that a train of loaded coal cars was damaged before it could be moved to safety. A barge containing 2,000 tons of coal, in the Monongahela River, was sunk to prevent its destruction by the flames. A short time after the fire was discovered the tipple was a mass of ruins. Between 1000 and 1500 men are employed at the plant and they will be thrown out of work.

Reynoldsville.—H. B. Miller, a mining engineer of Pittsburgh, Pa., and G. F. Miller, of Lewisburg, Pa., have taken under option about 835 acres of coal lands in Jefferson County, which are now being drilled. On these tracts, the top bed (Lower Freeport) is 6½ ft. thick, which will be stripped. Some 130 acres, with an average overburden of about 17 ft., will be stripped. To provide transportation, a branch line 1¾ miles in length will have to be built from O'Donnell, which is on the Low Grade division of the Pennsylvania R. R. Pittsburgh parties are interested in the project.

Another stripping proposition is being taken up near Allens Mills, near Reynoldsville, which will be drilled in the near future. About one mile of railroad will have to be built to the property. The coal that will be stripped is the Lower Freeport seam which is about 4 ft. thick. The average overburden of approximately 15 ft. consists principally of shales. Pittsburgh parties are said to be interested in this proposition.

Heilwood.—T. R. Johns, general manager of all Bethlehem Steel Cos. coal properties, makes the following announcement with reference to the Penn Mary Coal Co.:

"This company has been reorganized since acquiring the property of the Elkins Coal & Coke Co., at Morgantown, W. Va., this latter purchase representing an acquisition of 220,000,000 tons of by-product coal. The following appointments have been made: On the Pennsylvania division, with headquarters at Heilwood, Indiana County, Penn. Frank Pardoe, recently assistant general manager of the Rochester and Pittsburgh Coal and Iron Co., has been appointed general superintendent, effective Jan. 1, 1920; R. E. Abrams, superintendent; K. M. Quickel, chief engineer. On the West Virginia division, with headquarters at Morgantown, W. Va. Samuel Steinbach, formerly division manager for the Consolidation Coal Co., in the Somerset field, has been appointed general superintendent, effective Dec. 1, 1919; R. E. Pearson, chief engineer. T. R. Johns, general manager, will temporarily reside at Heilwood, Penn., but will establish offices at Bethlehem, Penn., Heilwood, Penn., and Morgantown, W. Va.

WEST VIRGINIA

Fairmont.—Owing to the fact that a fire in the Gypsy mine of the Consolidation Coal Co. is still smouldering, an examination just made by experts of the company having discovered that fact, no attempt will be made to operate the mine for the time being, the headings in which the fire is still burning having been sealed after the inspection.

Macdonald.—Mine officials affiliated with the mines of Fayette County, W. Va., propose to organize early in January what will be known as the Fayette County Mining Institue for the mutual benefit of the officials of that county.The Institute will be ushered into existence on Jan. 5. The place of meeting has not so far been determined, however. On the same date the new Mine Rescue Station, several of which are being established in various parts of the state, will be opened at Macdonald, all preparations having been completed with all equipment installed. The training of mine-rescue crews will be begun at once under the direction of Robert Lilly, director of such work on behalf of the Department of Mines.

Bluefield.—So far as it has been possible to secure such information, 8,933 cars of smokeless fuel were seized by the Railroad Administration, under instructions of the Fuel Administration, during the period of the strike. Information as to the final disposition, either partial or complete, has been furnished as to 5,788 cars of the number above given, no information having been vouchsafed as to the other 3145 cars. Up until Dec. 17, 201 cars out of the 8933 had been paid for. It is believed that outside of the 8933 cars, and including cars shipped since the information covering the 8933 cars was furnished, will show a larger number of cars paid for, the railroads having been disbursing large amount for coal seized and consumed by them. It is said, however, that there are 5000 cars in connection with the movement of which it will be necessary to obtain further information. Efforts will be made to have the 5000 cars referred to traced, so that payment on the tonnage represented may be expedited. The 8993 cars would represent a tonnage of 446,650.

Morgantown.—Attorneys representing West Virginia claimants have filed exceptions to the report of the referee in bankruptcy in connection with the sale of the properties, personal and real, of J. V. Thompson, of Uniontown; taking the position that the state courts of West Virginia alone have jurisdiction to pass upon the sale of properties of the Thompson estate in West Virginia, in cases where lien attachments are held. The West Virginia attorneys take the view that the West Virginia creditors holding lien attachments will receive 100c. on the dollar for their claims unless the sale of the Thompson properties to the Piedmont Coal Co. is confirmed, in which event the total amount of $1,000,000, alloted to West Virginia creditors, as their share of the sale of the properties of J. V. Thompson to the Piedmont Coal Co. for $5,000,000, will fall short about $250,000 of satisfying the West Virginia claims. It is pointed out that the West Virginia courts had jurisdiction over the lien attachments before bankruptcy proceedings were instituted against Thompson.

OHIO

Jackson—Operators in the Jackson field have turned their attention to the planting of commercial orchards both on worked over coal land and also on present operations. It has been found that the soil of Jackson and adjacent counties is adapted to the growing of fruit trees, and as a result thousands of acres have been set out in orchards. This plan should have more to commend it than the mere money return; any scheme which will tend to make mining regions more attractive, should have a direct beneficial effect on the population about the mines.

Columbus—W. D. McKinney, of the Southern Ohio Coal Exchange, estimates a loss of approximately $126,000,000 during the coal strike in the Central Competative area and in other sections where mining ceased. It is believed that the loss in Ohio was about 26,000,000, which was divided as follows: Miners, $11,000,000; operators, $6,500,000 and railroads $10,000,000. In the country at large the loss according to Mr. McKinney, was, railroads $40,000,000; miners $60,000,000 and operators $26,000,000. This does not include the loss caused indirectly to railroads and industrial plants which were closed down because of lack of fuel.

Columbus.—A meeting of a number of Ohio operators, particularly those in the Hocking field, was held at Columbus recently to discuss prices, in so far as to determine what increase must be added to contract figures to cover the increase of 14 per cent. in the miners' scale. After taking all matters into consideration, it was believed that something between 25 and 30 c. should be added to contracts for coal supplied from the so-called thick-vein district of Ohio. In other fields a higher increase will be added because of the higher cost of production in those fields. In the thin-vein district cost is higher, as is the case in the Jackson and Bergholtz fields.

Columbus—Something of a mix-up has occurred over the selection of the place for holding the next general convention of the United Mine Workers of America. Because of the fact that about 2200 delegates attend the convention, only large halls can be used for the meetings. It was felt that the convention should be held about Jan. 5, and at that time the large hall in Indianapolis was taken, and so the international officers turned their attention to Columbus where Memorial Hall, seating 5000 people could be secured. Just as it was practically decided to hold the convention in the Buckeye capital, John Moore, president of the Ohio organization informed the international officers that hotel arrangements for that number of delegates could not be secured in Columbus. So the time and place for holding the meeting is still unsettled.

KENTUCKY

Louisville.—A new state mine inspector will be appointed shortly by Governor Edward Morrow, who took office recently. J. C. Norwood, who has been mine inspector at various times for 30 years, resigned on Friday, Dec. 19, effective Jan. 15, when he will return to the University of Kentucky as head of the Department of Mines and Metallurgy. Politics in Kentucky changed from Democratic to Republican rule in the November elections.

ILLINOIS

Springfield.—Mines in this district are operation 75 per cent. with about 90 per cent. of the men back at work; three-fourths production after an idleness of forty-one days. Mines which normally produce 1000 tons of coal are now producing 750 tons and 2000-ton mines are producing 1500 tons and so on. Mine No. 58 of the Springfield District Mining Co., located at Taylorville, is hoisting the most coal of the company's mines at the present time.

Duquoin.—The Aluminum Ore Co., owning large coal tracts near Tilden, 15 miles east of here, recently closed a deal whereby they became owners of the Southern Traction Co., an uncompleted line extending from East St. Louis to Belleville and beyond that town into the rich coal producing territory in southern Illinois. The right of way of the line runs close to the tract of coal land owned by the Aluminum Ore Co., and it is expected that the line will be immediately rushed to completion and that developments be started on the tract. The Southern Traction Co., was organized some years ago and much had been done toward pushing the line into the coal fields in southern Illinois, when work was abandoned; at the time the Aluminum Ore Co. purchased the property, the rails (which were already in place) were worth much more than their original value. The coal which lies in the tract owned by the Aluminum Ore Co., is of good quality and hopes are now held out that the long felt need of an electric line outlet to St. Louis from the southern Illinois fields is about to take place. This hope is almost guaranteed by the fact that the Aluminum Ore Co., whose plant is near eastern St. Louis, needs the coal for its own use, and this proposed line should provide satisfactory transportation.

INDIANA

Evansville.—Reports from surrounding districts show that five shot firers have been killed recently as a result of premature explosions, two men being killed in one accident, and three in another.

Sullivan.—A disastrous fire has been raging in the Glendora mine, three miles northeast of this place, owned by the Consolidated Indiana Coal Co. A force of miners fought the flames all of one night; the fire started from a shot which was set off after the miners left the shaft late in the afternoon. About 175 men are thrown out of work as a result of the fire.

Evansville.—Auditors of the Drexel banking interests of Philadelphia have visited here and other places where the St. Bernard Mining Co. has offices, preparatory to the visit of Philadelphia capitalists to Earlington, Ky., it was reported in local mining circles. Some of the largest mines of this company are at Earlington. The Drexel interests have been endeavoring to take over the St. Barnard interests, including stores, lands and mineral rights by Jan. 1. St. Bernard stockholders, most of whom live in the east, were said to have asked $2,500,000 for their holdings. Other eastern capitalists are said to be merging independent mines in the Madisonville-Earlington districts.

Terre Haute.—Production of coal in the Indiana fields is rapidly increasing according to reports received at the headquarter in this city from the Indiana Bituminous Coal Operators' Association. The north field, in this vicinity, produced 34,225 tons on one day recently, while the south field, comprising the Greene and Sullivan Counties' mines, produced 24,054 tons, making a total of 58,279 tons. Practically all mines are now at work, with the exception of two in the Clinton field, where the men refused to accept the terms of the agreement which ended the nation-wide strike. The men at the Fayette mine, in Fayette Township, who refused to work on one occasion because their working clothes had not been properly dried, have returned to work.

Indianapolis.—Cary Littlejohn, State Mine Inspector, has completed a report for the Indiana year book covering the state fiscal year ended Sept. 30, 1919. The report Peerless-Elkhorn Coal Co., organized by J. B. Ramey and others with $100,000 capital. Development work is to start at once. Beefhide Creek, in eastern Letcher County, is to be opened by a several-mile branch line of the Baltimore & Ohio's detached branch, which will start from the main line at Myra. Large Northern interests will develop the Joe Bentley coal land tract of several thousand acres.

"The headwaters of the Kentucky River is another new section to be opened in the Elkhorn field—a branch of the Louisville & Nashville, to be extended several miles to the Potter-Wright tract, which is to be developed by the Detroit-Elk Coal Co., a million-dollar Detroit company. S. L. Bastin, Mater, Ky., will be at the head of this work.

"A further extension of the Rockhouse Creek branch road is to be made from Caudill's Branch, where purchases and leases have been made. A few weeks ago the L. & N. completed its branch road to Caudill's Branch, supplying a half dozen coal companies, including the Rockhouse Coal Co., the Midland Coal Co., the Caudill's Branch Coal Co., the Marion Coal Co. and others. Another new extension is the Carr's Fork branch out from Hamden. A recent contract was let for its further extension to Yellow Creek, in Knott County, where the Knott County Coal Corporation is starting the work on an extensive development.

KANSAS

Topeka.—A strip mine with a 14-inch seam of coal is said to be operated near here. It is the first coal produced in this vicinity in many years.

Topeka.—The Kansas supreme court has issued an order directing the receivers to turn back the coal mines to their owners. The order provides that this be done at once, and that the receivers proceed to wind up their affairs as quickly as possible.

Industrial News

Connersville, Ind.—The Burr Mining Co. has increased its capital stock from $30,000 to $200,000.

Charleston, W. Va.—The Hazy Creek Coal Co. is arranging for the early development of about 1100 acres of coal properties.

Harlan, Ky.—The Shawnee Gas Coal Co. has increased its capital from $90,000 to $110,000, for proposed business expansion.

Lexington, Ky.—The Wisconsin Coal Co., has been incorporated with a capital of $200,000 by N. B. Perkins, J. H. Bowling and others.

Covington, Ky.—The Elkhorn Junior Coal Co. has increased its capitalization from $25,000 to $100,000, to provide for general business expansion.

Cleveland, Ohio.—The Kempton Coal Co., has been chartered with a capital of $25,000 by W. J. Zoul, John T. Curry, F. G. Johns, L. C. Misch and C. H. Dittoe.

Louisville, Ky.—Nothing new has developed in the reports that Philadelphia capitalists would buy the big properties of the St. Bernard Mining Co., in western Kentucky.

Louisville, Ky.—The Centertown Coal Co., of Louisville, has filed amended articles changing its name to the Tucker Coal Co., and decreasing its capital from $250,000 to $200,000.

Charleston, W. Va.—A controlling interest in the Bregle Coal Co. has been secured by Max Kriegle. This company has an operation at Dana, on Campbell's Creek, in the Kanawha County field.

Pineville, Ky.—The Meadow Martin Coal Co., which recently filed notice of a change in its corporate name to the Cain Coal Co., has increased its capital of $25,000, for proposed business expansion.

Cleveland, Ohio.—The Cleveland-Massillon Coal Co., has been chartered with a capital of $51,500 to mine and sell coal. The incorporators are: Isaac F. Orr, W. R. Sheppard, R. B. Graham, H. Anderson and Robb O. Bartholomew.

Cleveland, Ohio—The Cleveland Macksburg Coal Co., has been chartered with a capital of $95,000 to mine and sell coal. The incorporators are: Herman C. Schneider, William Kaiser, Albert Schneider, and Homer J. N. Stafford.

Sprigg, W. Va.—The Crystal Block Coal Co., in Mingo County, is understood to be having plans prepared for the construction of a large new coal tipple at its plant for increased operations. The structure is estimated to cost $50,000.

Boomer, W. Va.—Boomer, Charleston, and Mt. Hope investors have announced plans for development of 12,000 acres of coal land in this district of Fayette County. They will begin with a drift mine and contemplate an annual output of 200,000 tons.

Dora, Ala.—The Ferrier Coal Co., in Walker County, recently incorporated, has perfected its organization, and is arranging plans for the development of coal properties, to have a daily capacity of about 150 tons. M. McCutcheon is president.

Charleston, W. Va.—The King Fuel Co., of Logan, W. Va., has incorporated with a capital stock of $500,000. The incorporators are: A. A. King, Huntington, W. Va.; H. B. Smith, D. W. Hill, T. B. Price and A. B. Hodges, all of Charleston, W. Va.

Bluefield, W. Va.—The Northwest Fuel Co., of Goodwill, has been organized, the company having a capital stock of $25,000, with the following principal stockholders: J. E. Biggs, Mary J. Biggs, Frank C. Biggs, E. E. Hartsook and H. J. Hartsook.

Charleston, W. Va.—Some new equipment is being installed, at the mines of the Babcock Coal and Coke Co. at Clifftop, an increase of production being the purpose of the purchase of such new equipment. The Babcock company is headed by George Bean, of Charleston.

Charleston, W. Va.—The Brewer, Harrison Coal Co., of Elkins, W. Va., has been incorporated to operate mines in Lewis County, W. Va.; capital stock, $125,000; incorporators; W. W. Brewer, of Belington, W. Va.; W. H. Young, of Clover Lick, W. Va.; and E. A. Bowers of Elkins, W. Va.

Elkins, W. Va.—The Greenmar Coal Co. has been incorporated with a capital of $50,000 to engage in general coal mining operations in the vicinity of Adrian, Upshur Co., W. Va. J. F. Brown, A. F. Martin and E. A. Bowers, all of Tallmansville, are the incorporators.

Williamson.—Fire completely destroyed the tipple and the machine shop of the Crystal Block Coal and Coke Co. at its No. 2 plant in Mingo County, during the last week of November, the fire being of unknown origin. The tipple was located not far from Spriggs, W. Va.

Mohawk, W. Va.—In connection with proposed improvements at the plant of the Mohawk Coal Co., to facilitate operations, arrangements have been completed for the construction of a new coal tipple and retarding conveyor system. It is planned to rush the work to early completion. L. E. Tiernay is president.

Red Rock, W. Va.—The Mineral State Coal Co., Munsey Bldg., Baltimore, Md., is understood to have completed arrangements for the proposed improvements at its plant in the Red Rock district, Upshur County. The work includes the installation of a new generator unit, as well as new coal mining machinery and equipment.

Bluefield, W. Va.—The Hamlin Coal Co., whose plant is located near Dante, Virginia, has changed hands, E. S. Reid, A. S. Adams and others having purchased the holdings of the company for a consideration of $50,000, it is understood. The purchasers contemplate making extensive improvements and will erect a large number of dwellings for miners.

Louisville, Ky.—A report from Middlesboro, Ky., is to the effect that the Peabody interests of Chicago have closed a deal for 100,000 acres of coal and timber land on Red Bird, Bullskin, Hell-For-Sartin and Troublesome creeks in Clay and Leslie counties, which results in the Peabody interests having a total of 300,000 acres of coal lands in that section.

Morgantown, W. Va.—Mines in Monongalia County will be operated by the C. E. Watson Coal Co., which has just been organized by Morgantown people with a capital of $25,000, the following being active in the organization of the company: Charles E. Watson, Mary Watson, A. M Nouse, James R. Mooreland and Robert E. Guy, all of Morgantown, W. Va.

Wheeling, W. Va.—Pennsylvania capitalists will organize a $500,000 company for the purpose of developing coal land in this state. They have obtained a charter of incorporation under the name of the Gowen Coal and Coke Co. George H. Leathers, of Oakmont, Penn.; Frank Newington, of Apollo, Pa., and Harry W. Cannon, of Monongahela, Penn., are among the incorporators.

Wheeling, W. Va.—Pennsylvania capitalists will organize a $500,000 company for the purpose of developing coal land in West Virginia. They have obtained a charter of incorporation under the name of the Cowen Coal and Coke Co. George H. Leathers, of Oakmont, Penn.; Frank Newington, of Apollo. Penn.; and Harry W. Cannon, of Monongahela, Penn., are among the incorporators.

Princeton, W Va.—West Virginia and Virginia investors organized a $400,000 company for coal mining near Princeton. They have incorporated as the Monticello Smokeless Coal Co., with a capitalization of $400,000. H. E. De Jarnette, of Princeton; Ernest Merrill, of Beckley, W. Va.; Richard Hancock, of Lynchburg, and John R. Morriss, of Charlottsville, Va., are among the incorporators.

Charleston, W Va.—Fire which visited the plant of the Royal Block Coal Co., at Morrisvale, in Boone County, on Thuraday, Dec. 18, destroyed the power house of the company at a total loss of $20,000, only partly covered by insurance. The fire started in the boiler house of the plant, it is stated, and spread to the power house. It became necessary to suspend operations as a result of the destruction of the power house.

Huntington, W. Va.—Further details of the plans of the Sprigg Coal Co., whose organization has been previously mentioned, have been learned. The plant to be established at Sprigg will cost between $25,000 and $50,000, and the plant will be able to produce coal at the rate of about 100,000 tons a year. The company is now arranging to purchase mine cars, steel rail and later will purchase electrical equipment.

Davy, W. Va.—The Atlantic Smokeless Coal Co., recently organized, is completing arrangements for the installation of mining equipment for the proposed development of about 2100 acres of coal properties in the Davy district, McDowell County, to provide a daily capacity of about 500 tons. It is understood that the cost of machinery and equipment is placed at approximately $150,000. George Wolfe is president, treasurer and manager.

Columbus, Ohio.—The authorized capital of the Bixler Coal Co. has been increased from $75,000 to $200,000. The company operates additional acreage which has been purchased at the company's mines, near Barnesville, in Belmont County, and new equipment will be installed. It is planned to erect a new tipple at a later date. J. E. Jones is general manaager, and the offices are in the Columbus Savings and Trust Building, of this place.

Pittsburgh, Penn.—A change in the merchandising policy of the R. D. Nuttal Co. of this place, has just been announced, effec-

tive Jan. 1, 1920. Under the new arrangemen the Westinghouse Electric and Manufacturing salesmen throughout the United States will handle the railway and mine products of the R. D. Nuttal Co. All Nuttal industrial lines and other products, however, will be taken care of through the main Nuttall office, at Pittsburgh, Penn.

Pineville, Ky.—The Kentucky Collieries Corporation, recently incorporated with a capital of $150,000, has perfected its organization, and is having plans prepared for the development of about 4800 acres of coal lands in the Pineville district of Bell County. Complete mining equipment and machinery will be installed, and it is proposed to have a daily initial capacity of about 400 tons. T. C. Hughes is president and treasurer; R. W. Moon, vice president, and Shepard Sawyer, secretary.

Pittsburgh, Penn.—W. E. Moore & Co., engineers of this place, are designing a new carbide plant for the Farmers Standard Carbide Co., at Freydenburg Falls, N. Y. A waterfall of 46 ft. will be developed to a capacity of 3700 hp. A Moore 3-phase carbide furnace will be installed, together with crushing, screening, can-making and packing machinery, to handle an output of 30 tons per day. W. B. Ragatz, of the Union Carbide Co., has been engaged as works manager.

Charleston, W. Va.—Announcement has just been made of the formation of a new coal concern, known as the Barren Creek Colliery Co., which will develop a tract of land on the Elk River, two miles north of Clendenin, in Kanawha County. Officers for the most part are the same as those of the Hartland Colliery Co. John Hart is president, Robert McCabe, vice president, and Edward Hart, secretary and treasurer. Eight hundred acres of coal land, 397 in fee and the balance in lease have been acquired.

Calgary, Alta.—A settlement has been effected between the coal mine operators of Alberta and representatives of the United Mine Workers of America, under which the miners will receive an increase in wages of 14 per cent. An order embodying this arrangement has been issued by W. H. Armstrong, Director of Coal Operations. Members of the "One Big Union" are not included in the agreement and will be debarred from working in the mines of district No. 18, which includes Alberta and eastern British Columbia.

Huntington, W Va.—Thousands of acres of coal and timber land in the mineral and timber regions of West Virginia, Ohio and Pennsylvania are to be developed through the activities of the Tri-State Coal and Timber Land Association. The organization has been chartered here with $600,000 capital. Pennsylvania and West Virginia capital will finance the enterprise. The incorporators are J. K. Oney, A. K. Kessler, L. H. Cammack, Huntington; G. H. Leathers, Harry W. Cannon and Howard H. Pratt, Pittsburgh, Penn.

Bluefield, W. V.—What was formerly the Buckhannon Coal Co. is now the Mayers Coal Corporation, a reorganization having been effected following the purchase of the company by W. R. Crenshaw and others of this city. The capital of the new company has been fixed at $150,000. The plant and holdings of the company are near Drill, Va., on the Clinch Valley division of the Norfolk & Western R. R. It is understood that the reorganized company has secured additional acreage and will increase production to 1,000 tons a day.

Logan, W. Va.—Southern West Virginia coal men and capitalists are interested in the Faulkner Coal Co., which has just been organized with a capital stock of $100,000. The company has a tract of coal land near Faulkner, in Logan County, which it expects to develop at a reasonably early date. The company will maintain its general offices, however, at Huntington. Among those active in the organization of the new concern are W. E. Deegans, Huntington; G. E. Scholl, J. Frank Grimet, of Huntington; J. M. Turner, Welch; J. H. Taylor, of Pinson Fork, all of West Virginia.

Uniontown, Ky.—The Union County Mining Co. with headquarters at 444 Fourth St., Louisville, Ky., has been organized for the development of about 4000 acres of coal properties located in Union County. The plans include the installation of complete mining equipment, the construction of a power plant (the machinery to be electrically operated wherever possible), and the construction of one-half mile of railroad. It is proposed to have a daily capacity of about 1000 tons. D. H. Lang is president; W. L. Jarvis, vice president; Burton Vance, secretary, and Fred Russ, treasurer. R. F. Peters is manager.

New York, N. Y.—The firm of Willard Sutherland & Co., with headquarters at this place, has incorporated and after Jan. 1, 1920, the name will be Willard, Sutherland & Co., Inc. The officers of the new corporation are to be Le Baron S. Willard, president; John E. Sutherland, vice president; Frank Stocks, treasurer; Henry W. Goddard, secretary. This firm has been actively engaged in the bunkering business for about 15 years, and has offices in New York, Philadelphia, Baltimore, Newport News and Norfolk. The firm is also the American representative at important coal depots at many parts throughout the world.

Sydney, N. S.—President D. H. McDougall, of the Nova Scotia Steel and Coal Co., who has returned from a two-months trip to England and the European continent, in the interests of the company, states that the result of his visit has been highly encouraging. The company has formed valuable connections abroad and arranged for important business in Belgium and elsewhere. The Nova Scotia company purchased for $2,000,000 the Belgian interests in the Acadia Coal Co., giving the company extensive and valuable coal areas in Pictou County and enabling them largely to increase the scale of their operations.

Chicago, Ill.—Fairbanks, Morse & Co., will build a $1,500,000 foundry in Beloit, Wis., which it is stated will be one of the most modern plants of its kind and equal any in size and output. When completed it will be 900 ft. long and 550 ft. wide, and have an ultimate capacity of 350 to 400 tons of gray iron daily. The big foundry will eventually employ 1500 men, and 1500 additional men will be required in other parts of the works to meet the increased production that will result. Fairbanks, Morse & Co. will then employ 7000 men at the whole plant. When the 11-acre foundry is completed, it will not only be the most complete as regards efficient handling of materials, but also in provisions for ideal working conditions.

Valparaiso, Chile.—Efforts made by Japanese to establish themselves in Chile, particularly in the coal and iron fields, are exciting considerable interest. Already they have made much progress in Peru. In Chile also, they are beginning this work and it has been said here that they seek particularly to gain a footing in regions that are strong both from a stragetic and industrial point, as for example Concepcion Bay, where there are many coal mines. According to newspaper reports, Japanese have acquired an option on some of these mines, including the mines of Pilpilco, for which an offer of £180,000 (normally about $875,000) has been made. The Japanese syndicate, it is reported, plans to develop the coal industry at Concepcion and introduce modern machinery.

Williamson, W. Va.—While so far unconfirmed, rumors are to the effect that the Red Jacket Consolidated Coal Co. and the Red Jacket Junior Coal Co. properties in the Williamson field have been sold, though to whom it is not known; the same rumors naming the U. S. Coal and Coke Co., the Solvay Colliery Co. and the Italian Government as possible purchasers. Belief that the U. S. Coal and Coke Co. may be a possible purchaser is based on the fact that that company recently acquired a large acreage from the United Thacker Coal and Coke Co., a part of such coal land purchased being on Mate Creek, adjoining the Red Jacket property. Some time ago it was believed that a sale of the Red Jacket properties was in prospect, as an inventory was at that time made of the plants of the company, but at that particular time the sale fell through. The Red Jacket companies have extensive holdings on Mate Creek as well as in other parts of Mingo County.

St. Louis, Mo.—The American Steam Conveyor Corporation, of Chicago, announces that the Atlas Machinery and Supply Co. is now handling the sales of the American corporation's products in its St. Louis territory. The Atlas company has offices at 1416 Syndicate Trust Bldg., St. Louis, Mo., and is a new sales organization in that vicinity. It is headed by William H. Patton, who recently returned to the United States after two years' service in the army, during which time he was in nine branches of the service, gaining experience of great practical value. Associated with Mr. Patton is his brother, W. R. Patton, who for the past 20 years has traveled the Central West, engaged in the sale of power plant equipment. During the past four years he has represented several large manufacturers as district manager. N. B. Stewart, who has been identified with the power plant machinery business at St. Louis for 25 years, has also associated himself with this company.

Ottawa, Canada.—The Research Council of Canada announces that reports received from the Lignite Utilization Board indicate that a plant for the briquetting of lignite will be in operation near Estevan, Sask, in August next, which will produce 30,000 tons of briquets per year. These briquets will sell for about $9.40 per ton in Winnipeg. It is expected that this may be the beginning of an industry which will in a measure help to solve the fuel problem of the Canadian West. The Council has appointed a Fuel Research Board to undertake the investigation and standardization of the coal of western Canada, the reason for this step being that the Alberta coals are not of equal value. The use of inferior varieties in Winnipeg and other cities east of Alberta, tends to discourage the use of western coal. If the coals were standardized, the better varieties of soft coal might replace the soft coal now imported into Manitoba and Saskatchewan from the United States.

Huntington, W. Va.—Pittsburgh and Huntington business men have joined in organizing the Tri-State Coal and Timber Lands Association with a capitalization of $600,000. The company will maintain offices in the Columbia Building, at Pittsburgh, Penn. and at 821 Fifth Avenue, Huntington. It is not the purpose of the company at this time to attempt operations anywhere but to deal in coal and timber leases, particularly in Logan and Boone County fields, where, since the strike has been ended, there has been an additional demand for coal lands. However, the company has made it plain that it may ultimately attempt to develop some of the properties which it may acquire. Officers of the new concern are: J. C. Oney, president; G. H. Lealters, vice president; L. H. Cammack, secretary and Judge John L. Whitten, treasurer and counsel. Others largely interested in the new concern are: Howard A. Pratt, a Pittsburgh merchant; Harry W. Cannon, of the Allegheny County bar, and Dr. A. K. Kessler, of Huntington.

Victoria, B. C.—It is reported from London, England, that re-organization of the Canadian Collieries, Ltd., operating collieries on Vancouver Island, British Columbia, has been decided upon. As a result, the property will be handed over to the bond-holders; or, rather, the changes contemplated virtually will have such an effect. On Jan. 19 a meeting will be held to authorize the plan. In this connection the London Times observes: "To what extent the company will be able to pay interest on debentures will depend upon the ability to sell the coal it can produce. The company has coal but the difficulty is to sell it in sufficient quantities, but trade on the Pacific no doubt will expend." No statement has been given out by the company's local management. whose headquarters are in Victoria. The Canadian Collieries, Ltd., has extensive holdings on Vancouver Island. It has producing mines at Comox, Extension and South Wellington, and coal rights throughout a large section of what is known as the Esquimalt & Nanaimo Railway belt.

New York, N. Y.—The Central Railroad of New Jersey has had in operation for several months, what is said to be the largest and most up to date coal terminal in New York Harbor, known as Pier 18, Jersey City, N. J. It is located in the Communipaw section of the Jersey City waterfront, west of Ellis Island, northwest of Bedloes Island. northeast of Black Tom Island, and, having a depth of 30 feet of water at mean low tide, it is accessible for large vessels. This terminal, costing in excess of $3,000,000, consists of a reinforced concrete pier 970 ft. in length (on which two McMyler Car Dumpers are now in operation), two thawing houses, a yard layout with a capacity of 1500 cars and a modern power house for furnishing the necessary steam and electric power as well as compressed air for the manipulation of the machinery of the terminal. These facilities, combined with its central location in the harbor, afford many important advantages. The plant can dump 50 cars per hr., giving a daily turn over of 400 cars per 8-hr. working day or an annual capacity of 7,000,000 tons.

New York, N. Y.—It is announced that negotiations have been completed whereby Jenkins Bros., of this place, will. in the near

future, increase their manufacturing facilities, by owning and operating a plant in Bridgeport, Conn. This plant will be devoted entirely to the manufacture of the Jenkins valve—an engineering product which dates back to 1865, when Nathaniel Jenkins invented and first introduced the renewable disc type of valve. It is expected that Charles V. Barrington, who has a wide experience in the manufacture of valves, will be elected a vice-president of the company, and will be in charge of the Bridgeport plant. The manufacture of the Jenkins discs, sheet packings, pump valves and other mechanical rubber goods, will be continued at Elizabeth, N. J. The Canadian branch, Jenkins Bros. Ltd., of Montreal, has recently completed alterations and additions to its brass valve department, and now has in course of construction, a new 192 x 80 ft. iron valve foundry. The Canadian branch supplies Jenkins valves throughout Canada and foreign countries, while the Bridgeport plant will make valves for use in the United States and insular possessions

Reading, Penn.—Announcement has just been made that the Reading Iron Co. has acquired the plant of the E. & G. Brooke Iron Co., at Birdsboro, Penn. The acquisition of this important property adds to the already extensive manufacturing equipment of the Reading company, 16 double puddling furnaces, with a three-high double muck mill, a 24-in. three-high skelp mill with four heating furnaces, and a nail factory of 75 nail machines, the latter long known as one of the landmarks of the eastern Pennsylvania iron industry. Through this addition to its manufacturing facilities, the Reading Iron Co.'s skelp capacity is increased by 2800 tons per month, with a corresponding increase in the production of finished wrought iron pipe. The purchase of the E. & G. Brooke Co. represents the second step in plant expansion which the Reading company has made since the present executive management took charge a few months ago. Through the acquisition of the George B. Lessig Co. plant at Pottstown, Penn., last October, the Reading company secured an additional muck bar capacity of 2600 tons per month and incidentally became the largest manufacturer of cut nails in the United States. Through the acquisition of these plants the Reading Iron Co. is enabled to bring its muck bar and skelp capacity up to the capacity of its tube works and thus absolutely to control the quality of the material entering into its wrought iron pipe. The Reading Iron Co. now possesses the imposing total of 136 double puddling furnaces—equivalent to 272 single furnaces, or considerably more than double the number owned by the company's largest competitor.

Personals

Hugo L. Siegel, formerly general sales manager for the Ford Roofing Products Co., is now with the Walter A. Zelnicker Supply Co. as assistant to the president.

G. B. Livingood, who for the past two years has been one of the sales engineers of the Traylor Engineering and Manufacturing Co., of Allentown, Penn., has been appointed assistant sales manager of the mining and crushing department of this company.

Percy F. Kuhleman, who for several years was traffic manager for the Rutledge & Taylor Coal Co., Fisher Bldg., Chicago, has resigned to accept a position with the Sterling-Midland Coal Co., of Chicago. Both companies have properties in southern Illinois.

Albert A. Casey has joined the sales engineering staff of Henry P. Thompson, of Cincinnati, Ohio, who is a direct representative of the American Steam Conveyor Corporation, of Chicago. Mr. Casey is a graduate of the Ohio State University and a mechanical engineer

J. F. White, of Logan, W. Va., has been appointed district mine inspector by W. J. Heatherman, chief of the Department of Mines. Mr. White will have charge of the inspection of mines in the eleventh district. He was formerly connected with the Boone County Coal Corporation, as superintendent at its No. 10 plant.

John R. Porter, who for the last year has been a manager of mines of the New River Co., operating in the New River field of West Virginia, has resigned to enter the oil business in the West. Mr. Porter had been in the service of the New River Co. for a number of years, first as mine foreman and later as superintendent.

T. S. Cousins, general superintendent of two mines owned by the Equitable Coal and Coke Co., of Chicago, located at Duquoin, and Carterville, Ill., is now president of the Majesty Oil, Gas and Refining Co., with head offices in Duquoin, Ill. The company was recently formed and bought oil lands in southern Oklahoma; this company is now sinking several wells on the land.

General S. B. Stanbery, manager of the Chicago Lumber and Coal Co., with offices in the Union Central Building, has been appointed as a trustee of the Cincinnati Southern Ry., having been selected from a list of more than one hundred names presented to the Judges of the Superior Court for appointment to succeed John W. Peck; the latter resigned his position upon his appointment to the United States District Court judgeship.

Eugene McAuliffe, president of the Union Collieries Co, of St. Louis, Mo., and manager of the fuel properties of the Union Electric Light & Power Co., of St. Louis, delivered an address on Dec. 10, at a meeting of the St. Louis section of the American Institute of Mining and Metallurgical engineers. This meeting was held jointly with the Associated Engineering Societies of St. Louis. At one time Mr. McAuliffe was manager of the Fuel Conservation Section of the Fuel Administration.

John W. Meyer, formerly with the Security Coal and Mining Co., at Duquoin, Ill., and the Monitor Block Coal Co., of Carterville, Ill., is now superintendent of the mine owned by the Southern Gem Coal Co., of Chicago, which is located at Sesser, Ill. The Southern Gem Coal Co., is a new organization and the mine at Sesser has lately been sunk; a daily output of 2000 tons is expected when the mine is running full capacity. Mr. Meyer has been connected with mining in southern Illinois for a number of years.

E. A. Graig, who has been associated with the Westinghouse Air Brake Co. for 32 years, is export manager of the new department beginning operations on Jan. 1. This export department was organized, with headquarters in the Westinghouse Building, Pittsburgh, Penn., in order to provide facilities adequate to handle the increasing export business and to develop the company's foreign trade to a greater extent than has been heretofore possible. This department will be represented in the New York office by W. G. Kaylor and in South America by B. M. Oates.

Henry Devlin will fill the position made vacant by the death of John Newton. Mr. Devlin has long been a service member of the Mines' Inspection Staff, and for years has shared with the late Mr. Newton the responsibilities of the inspection of the Nanaimo district. He has had jurisdiction over the Comox and Extension coal mines. Pending another appointment Mr. Devlin's place is being taken by James Dixon, a member of the Board of Examiners, and who, under the terms of a recent amendment to the Coal Mines Regulation Act, also is an acting inspector.

Alexander Sharp, C. E., read a paper on "Coal and Its By-products" recently at one of a series of winter lectures being held under the auspices of the British Columbia Chamber of Mines. After speaking of the waste involved in the use of coal direct from the mine he observed that the principles of carbonizing coal should be adopted to supply cheap fuel for manufacturing and domestic purposes. Then the provincial iron ores would be smelted with a coke sold at $5 a ton. Then years from now, he asserted, not a scuttleful of raw coal would be consumed in the City of Vancouver, and the foundation would have been laid for a great by-product industry.

Robert Dick, of this city, recently purchased a half interest in the mine near Hurst, south of here, formerly owned by Messrs. Ross, Baskin & Smothers. Mr. Dick has been identified for a number of years with mining throughout this district. The mine is now operating full time, having been opened up last fall.

A loss estimated at $10,000 was caused recently when the office and supply house and several smaller buildings were completely destroyed by fire at the mine of the Big Muddy Coal and Iron Co., near Clifford, Williamson County. The fire originated from defective wiring. The buildings were amply supplied with hose and other fire fighting apparatus, but owing to the direction in which the flames traveled, it was impossible for these to be used.

Obituary

Charles K. Blackwood died on Dec. 14. He was vice president, assistant treasurer and a director of the Sullivan Machinery Co., of Chicago, Ill. Mr. Blackwood had been closely identified with and was an important factor in this company's growth during the past 17 years.

John Newton, for many years district mines inspector with headquarters at Nanaimo, B. C., died on Dec. 6. Although ill for months he continued his official duties up to within a few days of the end, having been on a trip of inspection of the Britannia Mines, Howe Sound, when overcome. His death occurred shortly after he returned to his home city. Mr. newton's work was almost entirely among the coal mines of Nanaimo District.

T. Truxton Stiles, a member of the well known engineering firm of Conner & Stiles, of Huntington, died on Sunday, Dec. 14, at the home of his father, T. Truxton Stiles, Sr., at Norristown, Penn. He had gone to Philadelphia to consult specialists, but became seriously ill upon his arrival there, and succumbed six days after reaching Philadelphia. He had been a resident of Huntington for five years and was 30 years of age. He leaves a wife and one child.

Trade Catalogs

Zelnicker's Bulletin No. 275. The Walter A. Zelnicker Supply Co., St. Louis, Mo. Folder. Pp. 12; 3½x8½; illustrated. List of special material and equipment for sale by this company.

Motor Operated Brakes for Alternating-Current Service. The Cutler-Hammer Manufacturing Co., Wilwaukee, Wis. Booklet A. Pp. 4; 8½x11 in.; illustrated. Description of the brake and its application noted.

Steam and Water Jet Apparatus. The Star Brass Works, Chicago, Ill. Bulletin No. 6. Pp. 10; 7½x10½ in.; illustrated. Description of the company's syphons, ejectors, exhausters and vacuum boosters, their application and operation.

Morrow Shaking Screens. The Morrow Manufacturing Co., Wellston, Ohio. Pp. 32; 8½x11 in.; illustrated. Descriptions and illustrations of types of equipment and complete coal mining plants designed and built by this company.

General Applications of Ball Bearings. The Gurney Ball Bearing Co., Jamestown, N. Y. Bulletin G-2. Pp. 42; 8¼x10¾ in.; illustrated. The object of this bulletin is to assist the designer and practical engineer in making applications of ball bearings in his work correctly and successfully. Such applications to various types of machines are shown.

Sullivan Utility Forge Hammer, Bulletin No. 72-D. **Sullivan Power-Driven Air Compressors,** Bulletin No. 75-R. **Sullivan Tandem Compound Corliss Air Compressors, Class "W C",** Bulletin No. 75-U. The Sullivan Machinery Co., Chicago, Ill. Respectively, pp. 8, 16 and 24; 6x9 in.; illustrated. Description of the machines and uses to which they can be put.

Coming Meetings

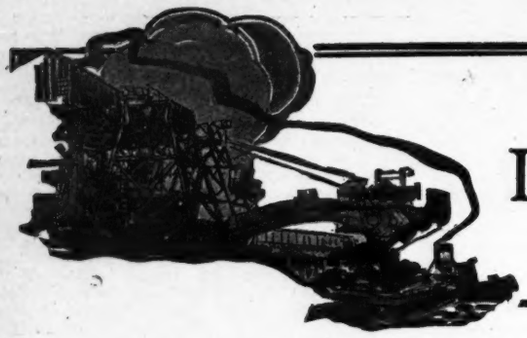
Northern West Virginia Coal Operators' Association will hold its next meeting Feb. 10, 1920, at Fairmont, W. Va. Secretary, George T. Bell, Fairmont, W. Va.

National Conference of Business Paper Editors will meet at the Astor Hotel, New York City, Jan. 16, 1920. Secretary, R. D. Hall, 36th St. and 10th Ave., New York City.

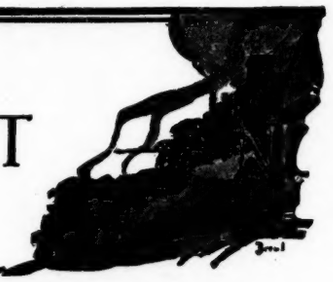
American Institute of Mining and Metallurgical Engineers will hold its next meeting Feb. 16 to 19, in New York City. Secretary, Bradley Stoughton, 29 West 39th St., New York City.

The Wholesale Coal Trade Association of New York will hold its next meeting Jan. 20, 1920, at the Whitehall Club, New York City. Secretary, Charles S. Allen, 1 Broadway, New York City.

The Rocky Mountain Coal Mining Institute will hold its winter meeting Jan. 19 to 22, 1920, at Denver, Colo., with headquarters at the Albany Hotel. Secretary, F. W. Whiteside, Denver, Colo.



MARKET DEPARTMENT



Production is curtailed by advent of Christmas holidays—Operation in nonunion fields is up to expectations—Industries hard up for fuel—More fuel oil to be used.

BECAUSE of the Christmas holiday when a large number of foreign-born miners stay away from the mines, sometimes until even after the first of the year, the production for the past week did not show the anticipated growth and even fell away. Although these men were not working, the railroad-car shortage was still a factor in the situation making it impossible in many sections to supply the heavy demand for coal. While the situation has been improved slightly, it will be some time before the coal industry can again be normal.

Many mines have been working short-handed, or with equipment which is not to their liking and not even enough of that. The operating conditions in the nonunion fields have continued to remain favorable, but there too, because of the demand arising from the union mines, the car supply has also tightened. However, the Railroad Administration has taken energetic measures to meet the car congestion and lack of empties.

Without any certain assurance that the car supply will be adequately improved, it is difficult to state just what will happen in the next two or three weeks toward bringing the production up to closer conformity with demand. Although the producers are doing the best they can to take care of both contract and spot customers, there is such a scarcity of fuel in some sections of the country that the enforcement of fuel restrictions is under consideration and operators are refusing new business.

Although the possible withdrawal of the government price limits still seems within the range of reasonable hope there exists an impression that nothing can be gained by agitation for perhaps a month or two. The Coal Commission opened its important sessions on Dec. 29, and the industry will eagerly await the result of its deliberations. Will it decide that coal must be mined without profit because the product is valuable or will it decide that because coal is of great value those mining it are more justified, even than others, in expecting that a fair profit shall be allowed them?

Industries, in general, are hard pressed for fuel, especially the iron industry. In the Connellsville region, several furnace interests have been scouring both the beehive and the byproduct coke markets but with no avail. Manufacturing plants, in particular have been seeking to replenish their rapidly diminishing stocks.

Anthracite maintains its record for steadiness, while the domestic sizes continue in good demand. The retail trade has been reaping the benefit of the fine midwinter demand. Zero weather and what has been, in some sections, a rather heavy fall of snow have created a large demand for domestic sizes from the small consumer, who is unable to store coal.

Restrictions on the use of coal have been rapidly removed, the Director-General of Railroads having issued an order that an overseas movement of coal equal to 50 per cent of the quantity imported in October may now be shipped from the ports of Baltimore and Newport News.

The long strike will not be without its unfortunate consequences. The Brooklyn Edison Co. has contracted to receive 3,235,000 bbls. of oil a year for three years from the Sinclair Oil Co. This Brooklyn concern uses 350,000 tons of coal a year. If it is to be removed from the ranks of the coal users the change will be a severe blow to the coal industry of New York and highly suggestive of a drift to oil which will be harmful to the coal industry and, we fear, detrimental to the new oil users also.

WEEKLY COAL PRODUCTION

The total output (including lignite and coal cokes) for the week ended Dec. 20, according to the reports of the Geological Survey, is estimated at 10,431,000 net tons. The average during the four weeks immediately preceding the strike, which may be regarded as normal, was 12,089,000 tons.

Compared with the week before, the output showed an increase of 4,631,000 tons, or 80 per cent. The recovery is the more significant when it is realized that in a single week the bituminous industry climbed from the depression of the strike period to a level of production higher than that of any week from mid-January to mid-August of the past year. Indeed, unless later returns cause a downward revision of the estimates, the curve of 1919 production has again crossed that of 1918

The output of anthracite during the same week is estimated at 1,727,000 net tons. This was a decrease of 355,000 tons when compared with the week before and lower by 112,000 tons, or 6.1 per cent. than that of the corresponding week, last year.

A shortage of coke cars in the Connellsville region held the output of beehive coke during the week of Dec. 20 to a figure not greatly in excess of the preceding week when the curtailment orders were in force. The total production is stimated at 386,000 tons, an increase of 25,000 tons over the week before, but still 72,000 tons less than during the week of Dec. 6, just before the order curtailing output and restoring maximum prices went into effect.

The maintenance of the maximum prices on coke has weakened the strong premium upon converting coal into coke at the mine which existed during the period from Oct. 31 to Dec. 8, when the war-time prices had been restored for coal, but not for coke. The fact, together with the recurrence of competition from by-product ovens as the latter receive supplies of coal, is believed to be in part responsible for the present level of production.

Atlantic Seaboard

BOSTON

Only light shipments being made. Operators apparently indifferent about taking on new business. No pressure to get coal forward. Poor car-supply affects volume for tidewater. Hampton Roads deliveries below normal. Anthracite steam sizes being shipped on purchase of ten days ago, but no more sales. Domestic sizes shipped somewhat more freely.

Bituminous—Fortunately for New England there is no great anxiety over steam coal, else the present light volume both all-rail and by water would be disquieting. Most of the 4000 cars that were being held by the railroads have now been turned over to the original consignees, and while many operators are trying to replace coal that was confiscated the tonnage they have thus far been able to ship is relatively small. There has been a good deal of confusion over regulations covering distribution and even today there are different versions by different authorities of the rules governing shipments to tide-water. The result has been a general slowing up of deliveries all along the line and the trade is so diffident that there is practically no comment on the bituminous situation.

Even with permits in hand, operators are apparently in no rush to make shipments. Lack of cars and the attitude of labor are factors that keep production down and under the conditions it is not surprising that it is difficult to get assurances of shipment much before the first of the year. During the holidays output it expected to be very light

and yet there is no snap to the business. There are some who predict a lively market in January, when present stocks are still further depleted, but at this writing there is no advance sign of any such demand. The whole industry is depressed by the limits imposed by the Government and until some settlement is reached that will make unnecessary the present fixed price schedule the market will doubtless continue in an unhealthy state. On contracts operators are free to add the wage increase: on spot sales they are not so privileged. It is easy to see therefore that wherever possible the bulk of the coal will move on contracts.

New England certainly betrays no uneasiness over continuing supplies either by water or rail. Rumors of a possible railroad strike early in January have put some consumers on a quiet canvass to get prompt coal but in general there is no pressure here from the steam trade. The recent "scare", so far as this territory was concerned, was largely artificial. At no time was there any genuine distress that could not have been met promptly by allowing coal to move to destination without interference.

The tonnage for the various tidewater piers has been considerably affected by poor car-supply. This has been notably true on the Baltimore & Ohio R. R. and we are beginning to see the result of withholding cars during the whole month of November. At New York and Philadelphia the volume of coal standing is by no means large, but yet there seems an ample supply for current requirements. Shippers are anxiously awaiting decision from Washington on the subject of export tonnage, a large amount of contract business being held up on this account.

Receipts of Pocahontas and New River at Hampton Roads are also below normal. Shipping plans were considerably deranged during the bituminous suspension and only gradually are the agencies able to straighten out their distribution. New England requirements from Norfolk and Newport News have been smaller the current year than for several seasons past, and there is no reason to suppose there will any lack either of boats or coal to fill contracts here that are still in effect.

Present prices on bituminous at wholesale range are as follows:

	Clearfield	Cambria and Somersets
F.o.b. Mines, per net ton	$2.95	$2.95
F.o.b. Phila., per gross ton	5.158	5.158
F.o b. New York, per gro ton	5.613	5.613
Alongside Boston, per gro ton	7.72	7.72

The legal price on Pocahontas and New River figures $4.692 per gross ton f.o.b. Hampton Roads, or $6.752 alongside Boston.

Anthracite—A considerable tonnage of steam sizes was disposed of in New England when the bituminous strike scare was at its height, but now the demand has utterly relaxed. Barley was sold freely at $1.75 @ $2.00 per gross ton f.o.b. mines, and even a tonnage of pea was readily absorbed at circular prices.

Egg, store and chestnut are now coming forward in better volume. The cities, for the most part, are now well supplied. There remain, however, a number of smaller localities where there is much difficulty in getting forward even a limited supply. The outlook is that most of these requirements will be met within the next three or four weeks and that New England will then be over the hump.

NEW YORK

Domestic sizes continue to be short. Demand is good. Steam coal situation slow with stocks accumulating. Bituminous situation serious. Supplies short and restrictions as to shipments may be restored unless coal moves easier. Operators refusing new orders.

Anthracite—The flurry in the situation during the low temperatures of a couple of weeks back has disappeared and the trade has again resolved itself into one of supply and demand. Dealers are in the market for all the domestic coals they can secure but they are not urging deliveries. Many of their customers have eaten deeply into their bins and are now ready to replenish their stocks.

The trade is in a good position to take care of any urgent demand that may be made upon it, provided it is not too long-lived, and provided there would not be any interrpution in deliveries.

Production was considerably curtailed during the week because of the holiday and the slowness of the men returning to work, many of the mines either operating with a reduced force the balance of the week or suspending operations entirely. The same situation is expected to prevail this week because of New Year's Day.

It is not expected that mining will become normal again until next week, and by the time the coal mined then reaches its destination the stocks now on hand will be badly depleted.

There is a steady but not urgent demand for shipments to Canada and New England. Salesmen returning from those sections report that dealers have good-sized stocks on hand and that their customers have been well provided for.

Stove and chestnut are in heaviest demand with egg and pea close seconds. There are plenty of orders ahead to take all the coal available and wholesale dealers report receiving many inquiries as to when deliveries may be expected. The peddler trade in New York City is now at its height and chestnut is the size most called for.

The demand for the smaller sizes is slow and there is considerable disappointment. Buckwheat is the shortest of the steam coals and the only one of the three sizes that is not causing any anxiety to the shippers. The company circular prevails in most instances but inferior grades are said to have been quoted at slightly lower figures. Rice and barley are in over supply and some producers are stocking them.

Dumpings at the local docks during the 7 days ended Dec. 26 were 4114 cars a decrease of 976 cars from the previous corresponding period.

Retail dealers in this city have been asked to increase the pay of their drivers, yardmen and engineers, etc., the increases ranging from 65 per cent. to 100 per cent. and which will mean, if granted, an increase of at least 25c per ton in the cost of coal. The committee of dealers to whom the work of bringing about a settlement of the controversy has been delegated has not yet made its report, but it is expected that there will be an increase in pay granted.

Following is the company schedule of prices for domestic and steam sizes at mine and this tidewater:—

	Mines	F.O.B. Tidewater
Broken	$5.95	$7.80
Egg	6.35	8.20
Stove	6.60	8.45
Chestnut	6.70	8.55
Pea	5.30	7.05
Buckwheat	3.40	5.15
Rice	2.75	4.50
Boiler	2.50	4.25
Barley	2.25	4.00

Individual domestic coals are generally quoted at 75c per ton higher than the above prices. Quotations for domestic coals at the upper parts are generally 5c higher on account of the difference in freight rates.

Bituminous—The local situation is not encouraging. There is a shortage of coal at the local piers and unless conditions improve quickly it may be necessary to reinstate the rules of the Fuel Administration, insofar as they relate to shipments to consumers who have reserve stocks of coal.

Since the discontinuance of the rules a few weeks ago deliveries have been freely made with the result that some consumers having reserve stocks, have received almost daily deliveries, while public service corporations have been able to secure barely enough to see them through. With some of these corporations the situation has been serious and it is feared that unless movement of coal quickens other consumers may have to use less coal.

With production reduced and a car supply which gives some mines barely 50 per cent. of their needs, receipts have been at low ebb and considerable of this has been taken by the railroads for their own use.

The mine workers have not yet returned to the mines in as full force as was expected but larger numbers are looked for after the holiday season. Some operators are not complaining at this time because of the poor car supply pointing out that with their curtailed working force they would not be able to load any additions cars to what they now receive.

The supply at the various harbor docks is low and there is much complaining of slow loading. The habor is filled with empty bottoms while extra charges continue.

Shippers are sold far ahead, and some are refusing new orders even at the full Government price

With the removal of restrictions governing the bunkering of coastwise vessels, that end of the industry showed an immediate improvement.

The dumpings at the local railroad piers during the 7 days ended Dec. 26 amounted to 3017 cars an increase of 971 cars over the previous 7 days. The number of cars on the tracks at the piers on Dec. 26 was 3156 as compared with 3044 cars on Dec. 19.

PHILADELPHIA

Anthracite activity maintained by wintry weather. Retail ordering only fair. Predicted heavy current consumption will create lively demand later. Dealers ask for more stove and nut. Egg quiet, and pea inclined to heaviness. Change of sizes again discussed. Trade in good shape financially. Fair call for steam coals. Bituminous demand on best grades. Fair tonnage arriving. Car shortage handicaps.

Anthracite—With snow-covered ground and moderately cold weather prevailing, the retail trade is moving along at a fair rate. Certain it is there is no snap to the trade, as the big supplies that most consumers have are sufficient to carry them along for weeks. However, with a continuance of the present weather there is bound to come a time about February when there will be a strong desire on the part of the public to replenish supplies. With the month of December closing it must be said that taken altogether it has been a real winter month and the consumption of coal has been heavy, and it is because of diminishing coal piles in the cellars that the people are showing any interest at all in ordering. Even at that the few orders that are being placed are not urgent, as shown when the consumer still maintains his insistence for stove and nut.

There have only been moderate receipts recently, as the holidays have cut down production very considerable and this is not expected to pick up until January is well under way, and even then should the weather be severe at the mines it will be sure to be considerably curtailed. It is quite likely that the slowing up of production for a few days was the only thing that saved the pea coal situation. The dealers are growing more inclined than ever to hold orders on this size, as many of them fear they will not be able to move all they have on hand. Of course they are making good deliveries of this size, as the weather is entirely favorable to the movement of pea. Egg coal is also none too easy to move, as the urgent demand for this size has disappeared and the current call is only moderate. At this time all dealers display an entire willingness to take all the stove and nut that is mined, and many of them insist that they are not being treated fairly. The claim is repeatedly made that these sizes are bringing heavy premiums in New England and this market suffers accordingly. Despite this claim the operators state that they are alloting their coal in equal proportions to all territories. This may possibly be the case with the companies, but with the independents it is more than likely true that they are still taking advantage of more favorable prices in other districts.

With the demand of the trade almost entirely centered up in the two sizes—stove and nut—the old question of the operators shipping only two sizes has again cropped up. It will be recalled that an attempt in this direction was made just prior to the war. At that time there was some sort of agreement among the producers to mix stove and nut, making a size for the range, and then combine nut and pea for domestic heating plants. Due to a lack of concert the scheme promptly fell flat. It is really believed that if the plan were to be adopted the retailers would be strongly in favor of it. For one thing it will require just one-half the bin room and obviates much of the trouble of the people insisting on certain sizes. Certain it is if pea continues to fall in public favor it will be up to the operators to take some drastic step to move their product. The dealers point out that the one great trouble with pea now is the heavy admixture of buckwheat, and there is no doubt that the other sizes have been diluted in similar manner It is a sure thing that if the retailers are first consulted on the question of two sizes they will insist that a standard of preparation be agreed upon and lived up to rigidly. At any rate the proposition has not as yet passed beyond the gossip stage, but there is a general tendency to agree that next spring is really the opportune time for the change if there is to be one.

There has not been the least tendency among the chronic price cutters in the retail trade to shade the price of pea coal. Usually this was the first size to feel the effects of such practices. Evidently the price-cutters have come to realize that there is nothing to be gained by attempting to move this size without a fair margin of profit. In this connection it is doubtful if the dealers as a whole are now able to get a gross margin of profit of $2.50, as established originally by the Fuel Administration. This margin has been considerably cut into since that time by greatly increased wages and the rising costs of material, equipment, etc. However, the business continues to be operated on as near a cash basis as possible, as the buying public still has the money to pay for what it wants. For this reason every retailer is in the best of financial condition, and the year

closing has been one of prosperity to most of them.

The steam coals are not at all active. The demand for buckwheat is about reaching its height, as it always does in the winter season and for that reason the current production, including washeries, is well taken up, and coal of this size is moving from storage in good volume and long before spring comes will probably be cleaned up. But the same is far from being true regarding the other steam sizes. The best that can be said for rice is that the demand is good, but nothing to boast off. Much the same can be said of barley. Of course on both of these sizes the consumption is greater than ever, but the production has also been greatly increased during the last two years by the completion of large washeries, and the consumption has not kept pace with this. It is thought, nevertheless, that both rice and barley will be amply taken care of in the next year or so, as a type of stoker is being introduced which burns these sizes very satisfactorily and new installations are being made all the time.

Bituminous—There is no particular strength to the steam trade. There is of course a strong demand for coals of the better grades, but very little of this coal is reaching the spot market. Inasmuch as the wage increase can be added to the contract price it naturally follows that the bulk of the production is being thus applied. There is quite a little fuel being offered at spot, but usually these are grades that ordinarily are not in demand, although the shippers are insisting that asking the top price of $2.95 plus 15c, the same as for the best grades, which they are allowed to do under Government regulations.

There is only a fair volume of coal arriving in this territory, as the Railroad Administration has directed that good shipments continued to be made to the territories which suffered most during the shortage. In addition the mines are badly handicapped by the car supply, which has lately grown acute. In the Pennsylvania districts most mines report but a 50 per cent supply, with some as low as 10 per cent. The wagon mines producing superior grades are able at this time to find a limited market, despite the fact that they are charging 50c a ton in excess of the $2.95 figure, which they are allowed.

BALTIMORE

Holiday period reached with the coal trade still in a state of uncertainty on many vital points. No satisfaction to be had on government payments on seized coal despite protests. Loading fell off due to poor car supply. Anthracite demand light here in face of cold weather.

Bituminous—Christmas has come and gone and New Years is at hand with the coal trade here in a state of uncertainty as to many vital issues. The throwing of responsibility from one government agency to another, not alone in the matter of wage and price-fixing possibilities, but in regard to payment for coal actually seized by the government and other important points as to distribution, etc., keeps the coal men guessing. In the matter of pay the trade here, which is affected to the tune of hundreds of thousands of tons seized from fuel at the piers or running there before Oct. 31, can get no one in Washington to assume responsibility for a ground of settlement. Shippers who made contracts with mines are being pushed for settlement, and serious financial entanglements are becoming manifest as the result of the dallying policy at Washington.

One government agency talks of settlement at the price this coal was sold for to export interests, another talks of settling at the mine contract price, and another even talks of payment at the government price, although the coal was shipped and sold before the government price was declared effective. The whole thing is a fine mess. Several prominent coal men have recently spent many weary hours in Washington recently to straighten out the tangle, but without success. Meanwhile from western Maryland and West Virginia complaints have poured in of poor car supply. Some mine interests wired Congressmen that the miners were growing dissatisfied because the production could not be taken care of. All this week the car supply has run only between 45 and 50 per cent., in many regions numerous mines have gone without cars to load for two and three days at a time. And the prospect is said to be for an even worse supply. A week or so ago the daily loadings on the divisions of interest here had run up to about 3000 cars, only about 600 short of normal, but this has dwindled until it is now running only from 2100 to 2600 cars per day on the Connellsville, Western Maryland, Monogah and Cumberland and Pennsylvania R. R. While the Pennsylvania has announced that Canton is again open for shipments of coal on coastwise, bay and harbor account, and Curtis Bay of the Baltimore & Ohio R. R. is receiving shipments under permits, the total of loaded cars at both piers at this writing is not much above 200. Local industries are being kept going by careful distribution of the line coal received here, but there is no oversupply anywhere. Demand fortunately is not over heavy.

Anthracite—While real cold weather has descended here and a fairly heavy snow has fallen, the local demand for anthracite is now but moderate. There was a brief spurt in orders, but this let up when it was found that some dealers were short of certain popular sizes. Now everybody has spent for Christmas, and it will probably be mid-January before there is any real rush to get fuel to supplement part-season supplies laid in last summer and fall. Unless the winter is unusually hard the expected shipments between now and Jan. 15 should take care of the situation fairly well, although yard reserves here are admittedly very short.

Lake Markets

PITTSBURGH

Car supplies probably about normal, but much under requirements. Steel mills not fully supplied.

There are conflicting claims as to the extent of the coal car shortage in the Pittsburgh district. A fair guess is that on the whole car supplies are about equal to the normal average, whereby they fall far short of the number desired, for coal operators are desirous of getting out maximum tonnages and large consumers are all anxious to build up stocks again. They fear two things, a serious railroad blockade on account of winter trade interprets the action of Dec. 22, whereby the operators called off the meeting scheduled to be held in Cleveland to consider the arbitration plan, as indicating that the operators accept the plan, as the miners have done, but it is thought a slip may occur nevertheless when the award is made.

Practically all the steel mills that closed early in December on account of lack of coal are in operation again, but many are not fully supplied and cannot operate as many departments as desired. Coal shortage is even referred to in the prognostications of some interests as likely to be more or less of a factor during the entire first quarter of 1920 in limiting steel production.

The coal market is quiet, there being little free coal through contract shipments absorbing the great bulk of the output, but there is enough turnover to make a market, the market being of course at the full Government limit: Slack, $2.10, mine-run, $2.35; screened, $2.60, per net tone at mine, Pittsburgh district, with a 15c brokerage allowance in some instances.

CLEVELAND

The local fuel situation is better in every way. Slightly more bituminous than is needed for minimum requirement is being received. Anthracite and Pocahontas shipments also are increased. The market is strong, ready to boom when government price restrictions are taken off.

Bituminous—With the great majority of southern and eastern Ohio mines again in operation, steam coal is moving into Cleveland in tonnages approximating normal. Estimates of receipts this week range from 70 to 85 per cent. of normal. Not only have all industries been supplied, but some of the larger ones getting fuel on contract are beginning to refuse it. For more than a week now the local fuel committee has not been functioning, and the only evidence of anything abnormal in the market is the government price schedule. Freeing of the market will not cause large increases, operators say, because pre-strike prices were not more than 15 per cent. higher than the government maximums.

So far the threatened car shortage has not made itself felt, and shipments are limited only by the labor supply. Steam coal users are showing a desire to contract and with the recent shortage in mind, it is expected some of the largest stockpiles in local history will be built up as soon as production permits. There is little demand for bituminous from domestic sources of consumption. With other fuels now available, the market for coke has almost disappeared. The $15 price has gone, and coke can be had in any quantity for $11, the lower figure of the strike-period spread of $11 @ $15.

Anthracite and Pocahontas—Anthracite is more plentiful now than Pocahontas but the demand is even lighter than in the usual holiday time dullness. Prices remain unchanged, but dealers believe a slight advance will be made about the middle of January. Dealers plan to make a large effort to get domestic consumers to stock in the spring and expect to stimulate demand greatly, with the fresh memory of the recent strike. Receipt of both of these grades are about 65 per cent. of the pre-strike average, but is sufficient to meet all requirements.

Prices of coal per net ton delivered in Cleveland, with bituminous prices largely nominal, are:

Anthracite—Egg, $11.75 @ 11.90; Chestnut, 12.00 @ 12.20; Grate, 11.75 @ 11.90; and stove, 11.90 @ 12.10.

Pocahontas—Forked, $10.00 @ 10.50; shoveled lump, 10.00; and mine-run, 7.40.

Domestic bituminous—West Virginia splint, $7.50; No. 8 Pittsburgh, 7.20; Massillon lump 8.25 @ 8.50; Cannel lump, 10.50; and Coshocton lump, 7.50.

Steam coal—No. 6 slack, $5.25 @ 5.50; No. 8 slack, 5.10 @ 5.50; Youghiogheny slack, 5.25 @ 5.50; No. 8 ¾ lump, 6.00 @ 6.25; No. 6 mine-run, 5.25 @ 5.50; and No. 8 mine-run, 5.75 @ 5.90.

BUFFALO

Considerable increase of bituminous output. Feeling not confident. Jobbers would have preferred no settlement. Anthracite plentiful.

Bituminous—The situation improves slowly to all appearance, for the supply of coal is enough to meet the moderate demand, but the shippers do not like the looks of things, for they fear that the government is going to play into the hands of the miners and that the operators will submit rather than to try the strike all over again. As it looks now it might have been better to let the strike settle itself, which it might have done before now, if the miners had not believed that the national authorities would finally give them a big concession.

The demand for bituminous is still light, but as the supply is not very certain it is well that it is so. The consumers laid in a big stock, only those with small storage capacity. The shippers did well by these and nobody in this territory suffered, but the supply was getting somewhat low when coal began to come in again. Jobbers report a wide difference as to amounts received. Some of them, who stand pretty close to the operators, are getting a good supply, while others are not doing much. They all find that most consumers are pretty well supplied. Canada seems to be well supplied. The fact that it is impossible to sell either breeze coke or steam sizes of anthracite here or in Canada shows that the consumer is not badly off.

All that the trade here can do is to wait for developments. Some of the mine owners are able to report a good output. The miners came back readily enough, though they are not in good working trim yet, after their long lay-off. One or two mines kept active all the time and have turned out a nice revenue to the owners. It is all a mixed mess, in some respects worse than it was with the men out, but if the proceedings promise an early settlement of the difficulties it would be easy to stand it all, but the promise is none too good.

Anthracite—The situation is easy. The shipping companies had promised that as soon as the lakes were closed they would continue the shipments and turn the coal into the city retail trestles and they did so, as they had done last winter. The result was that from the first there was all the coal that the retailers could well handle and the consumers were rapidly supplied. They found that there was coal enough and they did not buy more than they needed. It is not expected that anything short of a strike will change the situation.

It is reported by jobbers who are handling independent anthracite that they are also feeling the increase of supply and are not able to get the big premiums on their output that they have been getting. It may easily happen that they will soon have to sell down close to circular prices. Quite an amount of smallpox has developed at various points in Canada, and a quarantine has been set up here, nobody being allowed to cross the border this way without being vaccinated, which many people look upon as a big hardship. Then the money exchange is so high against Canada that it adds much to the cost of everything. Some-

times as much as 12 cents on a dollar is charged.

Coke—The demand for any grade of coke, from the best to breeze is light, though some of the jobbers report a fair amount of sales of coke for furnace use at former prices, $9 for 72-hour Connellsville foundry, $8 for 48-hour furnace, $7 for off grades and $7.75 for domestic sizes. There is no market for breeze coke. One shipper who used to handle quite an amount of it reports that it can hardly be given away. The iron furnaces in this district are running normally, apparently experiencing no difficulty from strikers.

COLUMBUS

With a short car supply and indifference on the part of some of the miners, there is a still further reduction in the output in all Ohio mining regions. Demand for all grades is good. There is no marked scarcity in any grade. Some coal is reaching the market from West Virginia and Kentucky.

The reduced car supply is now worrying operators and shippers in Ohio territory. With thousands of Ohio cars in the West and Northwest and with little prospects of return before a month, the car supply in Ohio districts amounts to about 50 per cent. of normal. In some sections the supply of equipments even lower than that figure. Railroad officials hold out no hope for immediate improvement and consequently production will be in a reduced basis for some time. This state of affairs in the face of a strong demand for all grades is causing considerable apprehension in the minds of coal men. With severe winter weather in prospect, it is feared that a fuel scarcity may result.

Production in the Hocking Valley district during the past week has been about 40 per cent. This is caused not only by lack of cars but also because of the disposition of some miners to wait until a final settlement of the wage scale is effected before returning to work. This is most apparent at the smaller mines. In some instances smaller mines have not resumed operations at all and others are operated with a small working force. In eastern Ohio the car supply is about 50 per cent. and production is about 35 to 40 per cent. Pomeroy Bend has about 50 per cent. production while Cambridge and Crooksville report about 40 per cent. output.

The domestic trade is firm in every regard. Demand from dealers is strong and all ask for immediate shipment. Retail stocks are depleted and few have any reserves to speak of. In a few instances dealers had 25 to 40 cars of coal come in when the fuel regulations were lifted, but those were exceptional cases. Consumers have placed orders for larger deliveries and many are in the market for their remaining winter's supply of fuel. Retail prices are still unsteady, depending on the price paid by the dealer. A tendency to standardize these prices is noted now. Hocking lump retails prices $6@$6.50, while mine-run is about 25 @50 cents less. Pocahontas lump is quite scarce and sells around $8.50. Some Pocahontas mine run is found. West Virginia splints retail in the neighborhood of $7.50 for lump and $7 for mine run.

The steam trade is also strong with the possible exception of screening where there is a slight slackening. Steam plants are in the market for reserve stocks as they used up a large part of surplus during the suspension. Rubber plants are good purchasers and the same is true of iron and steel concerns. Public institutions and public service concerns are buying actively. General manufacturing is also in the market. Railroads are not taking a large tonnage at the present time.

CINCINNATI

Coal receipts in the local market last week were curtailed because of the Christmas holiday. There was little or no change over the previous week, the car shortage still remaining the prime factor for hindering production.

An acute car shortage throughout all the coal-producing regions of West Virginia during the last half of this week largely counterbalanced the gains made in the production by the resumption of operations on a normal scale in the organized fields of West Virginia. Production following the strike settlement reached its pinnacle about the middle of last week in West Virginia. From that time on the dwindling car supply cut down the output from day to day. Local coal men expected the car shortage, but it was not expected to be quite so acute.

While the mines in the New River region from which Cincinnati gets the majority of its fuel felt the pinch of a car shortage to less extent than mines in other parts of the Chesapeake & Ohio R. R., yet the beginning of a car shortage even in that section made itself felt. All but eight mines in the New River field are now in regular operation and of the eight only two are still affected by the strike.

The retail business has not picked up any since the strike has been settled because producers are unable to keep pace with their contracts. Receipts in all grades of coal were very light the entire week. Industrial plants have been making a demand for steam coal which has been about evenly met by dealers.

It is the belief of operators that the car shortage will even grow worse as the new year approaches, owing to the pressure for cars in the West. Locally the situation is satisfactory when considered in connection with outside conditions. The trade is not suffering from the lack of coal, although it cannot be said to be entirely satisfied with the tonnage on hand.

Jobbers have had a strenuous time filling the orders placed in the summer and fall months. These orders have been pretty well cleaned off the books and comparatively few new orders are being received. Reports show that the receipts of bituminous coal here for the last week were far from normal owing to a majority of the miners not returning to work the day following Christmas. Operators are of the opinion that as soon as the railroads remedy the car shortage production will be brought to normal, as a majority of the mines in both West Virginia and Kentucky are back to work.

DETROIT

With shipments of bituminous still falling short of the movement before the strike, free coal is not plentiful.

Bituminous—Various causes appear to be interfering with the restoration of bituminous shipments in the volume that was arriving in Detroit before the recent strike. Coal is coming from the reopened mines, but in smaller quantity than before. Jobbers say this is in part due to insufficient supply of mine labor, owing to miners in some distrits having entered other lines of industry, and in part, also, to the inability of the mines to get sufficient car supply to handle normal shipments.

Some of the mines that were shipping heavily during the strike period are reported to be sending out less coal now either because of the inadequate car supply or because the mine workers feel the time is opportune for taking a rest to celebrate the holiday period.

The consumers of steam coal who have contracts find their position is advantageous as a considerable part of the coal now moving is to apply on these obligations. The operators, however, are giving notice that prices will be a little higher than at first arranged because they are availing themselves of the contract privilege of making adjustments in selling price to meet the higher scale of wages now in effect at the mines. This means an advance of 25 or 30c. a ton in cost of the coal to the buyer.

With the supply of free coal very much curtailed, buyers who have been satisfied to pick up coal as they could, without contracts, are finding it less easy to meet their requirements, though they still have the privilege of buying at the prices established by the Fuel Administration.

Anthracite—Jobbers say that a week or so of extremely low temperatures would probably bring such an active demand for anthracite from domestic consumers that retail dealers would be unable to supply their customers. Stocks on hand are of small size, while shipments are irregular with delivery uncertain. The improvement that was expected to materialize following the close of the lake navigation, is not yet apparent.

Lake Trade—Failing to force a passage through ice in the Straits of Mackinac, the steamer B. F. Berry, bound from Buffalo to Milwaukee with 10,000 tons of hard coal, has been placed in winter quarters at St. Ignace, Mich., without removing her cargo.

TORONTO

Market quiet. Bituminous supplies exhausted. Dealers awaiting shipments. Government prices not yet fixed. Plenty of anthracite on hand.

The market is quiet as domestic needs have been generally well supplied and orders for soft coal in any quantity cannot be filled as supplies are practically exhausted and none is now coming forward. Dealers anticipate receiving considerable consignments in the course of a few days. Government prices for coal have not yet been fixed, so quotation for wholesale lots cannot be given, as dealers do not know what they will be allowed to charge. Some of the yards have small quantities on hand for the retail trade. There are plentiful supplies of anthracite on the market since the close of navigation, and no shortage is anticipated.

Quotations for short tons are as follows:

Retail—

Anthracite, egg, stove, nut and grate	$12.75
Pea	11.25
Bituminous steam	9.00
Slack	8.00
Domestic lump	9.00
Cannel	12.50

BIRMINGHAM

Demand for steam coal good, but not specially insistent. Domestic grades scarce, the supply being very much short of requirements for the better grades. Output of coal considerably reduced during the holidays. Car supply ample to move all coal mined.

The demand for steam coal, though not considered specially strong, is sufficient to absorb all the coal available above contract requirements at this time, as the mines are making heavy shipments to contract customers whose quota was entirely or partially diverted to other courses during government distribution of fuel. Until such delayed shipments are caught up with, the tonnage for the spot trade and new contracts will necessarily be restricted. Operators are very cautious in taking on new business of any great volume in the way of contracts until conditions become more settled. There is no surplus coal of the better grades available, but some tonnage of Carbon Hill and other medium and lower grades can be had.

Domestic grades continue to be scarce. No retail yards have any considerable stock, but the retail demand at this time is spasmodic, being governed by the changing weather conditions, and the receipts, while light, have about equalled the outgo so far.

The Alabama field produced 320,000 tons during the week ending Dec. 20, as per figures compiled for the Geological Survey, closely approximating the output of Oct. 25, 1919, of 334,000 tons, which was the record production since the relinquishment of Government control last January. Production for the present week was crippled considerably by the shortage of labor during the holidays. Car supply continues sufficient to meet all requirements.

LOUISVILLE

Holiday layoffs and car shortage holding back production. Demand for all grades good. Continued mild weather making supplies go further. No serious shortages being reported.

Operators claim that holiday layoffs are further decreasing production throughout the fields, while car shortage is having its effect, as many mines loaded up with empties last week had trouble in securing supplies this week. Shipments as a whole have been very fair up to the present time. However, miners in many districts have not returned to work in any great numbers, or have walked out again over closed shop arguments.

Operators realize the need for collective bargaining and accord it, but will not deal with a union, and it is merely with the men as to whether or not they will work. Real facts of the case probably are that there are many small mines that cannot operate profitably today on Government prices, and therefore are down and making no effort to resume. The wagon mines have entirely been lost as a result of higher wages and reduced sales values, with the result that many of the smaller mines are not turning a wheel.

The retail demand for coal is fair, only there is not being any special activity shown by domestic consumers in efforts to secure fuel. Retailers are getting fairly good deliveries, and report that deliveries are moving fairly well, but at that there isn't much snap to the present demand.

Louisville retailers, as a whole, report that profits on the year will run much below normal, due to the fact that summer stocking was done on a very low margin of profit, and winter business has not been sufficient to keep the retailers busy. Jobbers report very little business, as they could not secure coal from producers, who are dealing direct with industrial buyers and retailers.

River shipments to both the Cincinnati and Louisville markets were heavier during October and November, due largely to the strike situation. In October, Louisville received 4828 tons by water, as against 4530 tons in 1918; and in November, 4112 tons as compared with 569 tons last year. Cincinnati has been averaging nicely all year, her lowest river tonnage being 11,613 tons in January, with 197,563 tons in September. However, in July, 1918, Cincinnati received 791,532 tons by river in one month, and hasn't gone beyond the 100,000-ton limit but once this year, whereas she shipped in 116,851 tons in May; 190,647 tons in June and 781,532 tons in July, 1918. However, her shipments this year have been much steadier than those of last season. Louisville in 1918 had 40,357 tons in July, whereas her best showing this year was 17,046 tons in June. There has been good river stages all year, and coal has been received every month, but tonnage is lacking.

Coke

CONNELLSVILLE

Car supplies very poor. Many blast furnaces short of coke.

Coke car supplies in the Connellsville region continue to be very scant, and production is little if any above the reduced rate of the one week in which there was Government limitation of output. Coal car supplies have been fairly plentiful. All the coke output appears to be going against regular contracts, leaving nothing to be offered in the open market, while there is a heavy inquiry for both small and large lots of furnace, with a moderate run of inquiry for foundry coke. One consumer has canvassed the trade, both the beehive producers and the by-product operations, for 10,000 tons of prompt furnace coke and has secured nothing. Nearly all the furnaces interests that regularly use Connellsville coke would take on more or less if available at the Government limit. All the furnaces that have contracts for coke are hoping that Government price control will be continued indefinitely, as they fear removal of the restriction would result in some of the coke that is due on contract being sold at fancy prices for prompt shipment. The market remains quotable at Government limits, $6 for furnace and $7 for foundry, per net ton at ovens.

Middle West

MID-WEST REVIEW

The coal market in the Middlewest is still far from settled. The same spirit of uncertainty and doubt which prevailed immediately before and during the strike is still with us. This, to a very large extent, is entirely due to the fact that all of the old powers of the Fuel Administration are now invested with the U. S. Railroad Administration, headed, of course, by Walker D. Hines.

The operators and jobbers of Illinois and Indiana coal have not forgotten how, earlier in the season, Mr. Hines' organization did everything they could to weaken and batter down a coal market which was, at that time, quite weak enough. It is not exaggeration to say that the coal trade is not looking to Mr. Hines for any favors.

Before the strike practically all the producers and jobbers of good coal had on their books enough business to run them for some time, say anywhere from six to ten weeks, perhaps further. This being the case, as soon as the strike was temporarily settled, and the men back at work, the operators began filling all of their old orders at the old prices. They were entitled to do this under a ruling of the Fuel Administration dated Nov. 13. In addition to shipping coal at the old prices a number of operators have added from 24c. to 26c. per ton extra on to the pre-strike prices. In other words, if a man bought a car of good southern Illinois prepared coal at $3.25 at mines, he now pays $3.50 or $3.51 for the same thing. This is strictly within the rights of the operator, as all of their contracts carry a clause providing for additional payment should the cost of mining be increased. Beginning in the middle of last September the coal market started to strengthen and advance slowly but surely. The summer months in this territory were particularly noteworthy because there was practically no demand for coal. The public was not interested and did not want to buy. As a result buying was very largely concentrated from after Sept. 15 to Nov. 1, the date of the strike. As a result the average operator had more orders on his books than he could comfortably take care of.

Naturally he does not take kindly toward entering orders for shipment at Government prices, these prices approximately are $1.00 per ton lower than the orders which he has on file. Of course some of the larger and better known operators are taking care of their established trade whether or not they had orders placed prior to Nov. 1. The situation which has been brought upon us is going to work an undeniable hardship on a number of retail dealers and factories, because they cannot pay more than the Government price for the coal, and the operators have so much higher priced business already on their books that they cannot see their way clear to accept further obligations at a lower price.

The car situation has been only fair since the ending of the strike, and indications are that it will not improve very materially as the season advances. Coal operators read with a sigh of relief that a definite date at last has been set for the return of the railroads to private ownership. The service rendered by the railroads, while under the supervision of the Railroad Administration has proved anything but satisfactory to the operators. The labor situation still remains doubtful. In a great many cases the men returned to work, and are doing their best to make up for lost time, but in other cases the miners are showing a spirit of unrest and dissatisfaction, which at a later date may develop into serious trouble. Uncertainty is the keynote of the whole situation in the middlewest.

CHICAGO

Taken all in all the coal situation is fairly satisfactory. Very few factories now are liable to close down on account of no coal. Practically every householder is fairly well supplied.

Chicago is now back to normal, as all restrictions brought about by the coal strike have been lifted. Coal from different producing fields in Illinois and Indiana is arriving in the city in liberal quantities and dealers who have been dangerously out of fuel now have an opportunty to renew their stocks. It cannot be said that there is anything like enough coal today, but there is enough to keep the wolf from the door for some time.

Anthracite coal continues to arrive in fairly satisfactory quantities, and some eastern coal is coming in. We understand that the Railroad Administration has a big tonnage of diverted eastern coal on hand and is now undergoing some embarrassment as to the disposition of this diverted tonnage.

Bituminous Coal

Government prices for bituminous coal are as follows.

	f. o. b. Per Ton	Chicago Rate to
Illinois		
Southern Illinois—		
Franklin, Saline and Williamson Counties, etc.		
Prepared sizes	$2.55	$1.32
Mine Run	2.35	1.55
Screenings	2.05	1.55
In some cases, mines with extra facilities for preparing coal very carefully, are allowed to add 10c. per ton for special preparation.		
Central Illinois—		
Springfield District.		
Prepared sizes	$2.55	1.32
Mine Run	2.35	1.32
Screenings	2.05	1.32
Northern Illinois—		
Prepared sizes	$3.25	$1.24
Mine Run	3.00	1.24
Screenings	2.75	1.24
Indiana		
Clinton Fourth Vein District—		
Prepared sizes	$2.55	$1.27
Mine Run	2.35	1.27
Screenings	2.05	1.27
Brasil Block—		
Prepared sizes	$3.60	$1.27
Mine Run	3.30	1.27
Screenings	2.05	1.27
Knox County, Fifth Vein District—		
Prepared sizes	$2.55	$1.37
Mine Run	2.35	1.37
Screenings	2.05	1.37
West Virginia		
New River and Pocahontas—		
Prepared sizes	$2.60	$2.60
Mine Run	2.35	2.60
Splint—		
Prepared sizes	$2.75 to $3.00	$2.60

MILWAUKEE

Following are the current prices of coal per ton at Milwaukee. An extra charge of 75c. per ton is made on coal carried into bins, and an additional charge of 25c. is added on all orders of less than one ton:

Anthracite	
Chestnut	$12.70
Stove	12.60
Egg	12.40
Pea	11.20
Buckwheat	9.75
Bituminous	
West Virginia, splint screened	8.00
Hi-Heat	8.00
Hocking, screened	7.75
Pittsburgh, screened	7.75
Pocahontas mine run	8.75
Pocahontas, screened	11.00
Cheerful Chunks	9.50
Smithing	8.75
Cannel	12.00
Steam Coal	
Youghiogheny, screened	7.00
Youghiogheny, pile run	6.75
Youghiogheny, screenings	5.75
Pittsburgh, screened	6.75
Pittsburgh, pile run	6.50
Pittsburgh, screenings	5.50
Hocking, screened	6.75
Hocking, pile run	6.50
Hocking, screenings	5.50
West Virginia, splint screened	7.00
West Virginia, pile run	7.00
West Virginia, screenings	5.75
Kentucky, screened	7.75
Kentucky, pile run	7.50
Kentucky, screenings	5.75
Pocahontas, mine run	7.75
Pocahontas, screened	11.00
Pocahontas, screenings	6.75
Smithing	7.75
Kanawha Gas	sold up
Bunker Coal for Steamers and Tugs	
Pittsburgh, lump	6.25
Pittsburgh, pile run	6 00
Youghiogheny, lump	6.50
Youghiogheny, pile run	6 25

ST. LOUIS

Conditions almost normal in St. Louis. Good demand for everything. Mines working steady with plenty of equipment. No high grade coal. Country conditions still bad.

The local situation is in fine shape, everything considered. The weather thus far has been ideal. It has been just cold enough to justify an even demand for fuel.

There has been a good tonnage of Mt. Olive and Standard coming in regularly, the mines working steady, having plenty of equipment, although most of it is eastern equipment, principally hoppers, which the trade in the west is unaccustomed to using and in many places these hoppers cannot be unloaded.

There is practically no Franklin County coal coming in at the present time and very little from Carterville. The dealers must pay $3.50@3.60 for this coal when the Government contends that the price should be $2.55@2 65. The dealers in St. Louis and vicinity are protesting to Washington and have asked the United States Attorney General to take some action against the Franklin County Operators' Association to compel them to ship on the unfilled orders at the price prevailing at time of shipment.

There is not anthracite coming in and practically no smokeless coal.

The Government price prevails on Standard and Mt. Olive coals, being $2.55@2.70 for the domestic sizes, $2.35@2.50 for mine run, and $2.05@2.20 for screenings.

The retail prices for coal are, f. o. b. sidewalk, Carterville $6.20, Mt. Olive $5.75 to Standard $5.45.